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Our cover features Dr Chris Brown who, besides being a qualified vet and popular TV celebrity, is also a very accomplished photographer. Our exclusive interview with Chris begins on page 16.

(Cover landscape image by Chris Brown. Image of Chris Brown by Paul Burrows.)

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IS IT TIME TO REVIVE THE TLR?

LET'S BE HONEST, most of us would like to have a digital medium format camera if only they were more affordable. Even the cheapest option – Pentax's excellent 645Z – is still pricier than a top-of-the-line D-SLR with a full-35mm sensor, and that's even before you start to consider lenses. But there are imaging quality benefits associated with big sensors – most notably an increased dynamic range – which simply can't be had any other way. No software-based short-cuts available here.

It was the same in the film days, except that there was much more choice and some rollfilm cameras were actually quite reasonably priced… like the fixed-lens rangefinder models and the last of the twin lens reflexes (TLRs).

The TLR's glory days were in the 1940s and '50s before the 35mm SLR – spearheaded by Nikon's F – largely killed it off. When I got into this business, the SLR – in any film format – actually reigned supreme and we all considered TLRs to be a bit of a joke. After all, they were comparatively bulky, cumbersome, slow and limited in their applications. Or so we thought. Ah, the callowness of youth! Over time I've come to revise these opinions, most recently when a retired working photographer donated a few more TLRs to my collection of classic cameras.

I like to spend a bit of time with new acquisitions and, playing around with a particularly nice Rollop from the mid-1950s, I was once again struck by the fact that what we once considered to be the TLR's failings are actually its main attributes. And it didn't take me long to progress to the idea that, in fact, here was the perfect platform for a truly affordable digital medium format camera.

So, by "affordable", I'm thinking under $5000, a lot of which would be accounted for by the sensor which, logically, has to be the Sony-made 50 MP CMOS that's doing good work in a lot of current DMF systems at the moment. My D-TLR (that has a nice look, doesn't it?) would have a fixed lens which, of course, could be precisely matched to the sensor. I'm thinking something with a 35mm-equivalent focal length of 35mm and, to keep the cost down, a maximum aperture of f2.8 or maybe even f3.5 (a 'traditional' speed for TLRs). Even though Sony's CMOS can deliver live view, I wouldn't have a monitor screen, but rather a simple mono read-out panel accompanied by the buttons for the basic capture settings of ISO, white balance, file format/size, colour space and maybe noise reduction. The image file options would be RAW (Adobe DNG for convenience) and a single JPEG setting (i.e. large/fine). For JPEGs, there'd be adjustments for saturation, contrast and sharpness plus a monochrome setting. Image replay/review would have to wait until you got home… just like in the good old days. The rest of my D-TLR would be purist heaven – manual aperture and shutter speed setting; manual focusing, but on a modern, bright focusing screen with a split-image rangefinder that's easy to use; and a waistlevel finder (of course) with magnifier. Focusing itself is 'old school' via a knob which extends or retracts the lens board using a simple cam drive. And without the need for an opening back or a film transport's bits, my D-TLR would actually be even easier to build than a rollfilm version… basically little more than a rigid aluminium alloy box which should also help keep manufacturing costs down. For the sake of convenience, I think I'd have to have a built-in exposure meter, but with a simple uncoupled arrangement (as on, for example, the Yashica Mat-124G) which would still be in keeping with the traditional TLR 'experience'.

If my entry-level D-TLR was a success, we could perhaps move up to a model with a monitor screen, TTL metering, auto exposure control and a few other luxuries.

Then who knows where? I really think I'm on to something here… the TLR revival could be just what digital medium format photography needs. On the other hand…

Paul Burrows

Paul Burrows, Editor

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Dr Chris Brown

'I'm A Photographer – Get Me In There!' TV vet and versatile presenter, Dr Chris Brown, loves overseas assignments because they're an opportunity to find new places for photography. The latest Canon Ambassador tells ***Camera*** all about his great love for photography and the challenges of working around his many TV commitments.

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NIKON KEEPS THE FAITH WITH D-SLRs...

HAVING REVEALED IT was working on a D5 model late last year, Nikon wasted no time in unveiling its next-generation pro-level D-SLR, using the giant CES exhibition in Las Vegas in early January as the launch platform. Although the old PMA event was folded into CES a few years ago, imaging isn't really a major part of the world's largest consumer electronics trade show and, aside from Nikon, the only other major brands represented in the LV Convention Centre's Central Hall were Canon, GoPro, Polaroid and Ricoh Imaging/Pentax. Of course, both Sony and Panasonic were showing cameras on their (huge) stands, but not, notably, Samsung which would seem to confirm that the company is indeed exiting this business. Contrary to other rumours though, Nikon did not announce it was buying Samsung's camera division, despite there being some obvious synergies.

Instead, on the day before CES opened, Nikon held a large international press conference to unveil the D5, a new 'APS-C' format D-SLR flagship called the D500, and its entry into the still-growing 'action cam' sector.

While the conference was billed 'The Dawn Of A New Era', there is still no sign that Nikon will have a full-frame mirrorless camera system any time soon in order to counter the rise and rise of Sony's A7 Series (of course, Canon is pretty much in the same boat too).

Nevertheless, the D5 is an impressive machine, extending all the key specs of the D4S and described at the launch as "…by far our best and most ambitious D-SLR". Similar in size and styling to its predecessor, the D5 has a new CMOS sensor with a total pixel count of 21.33 million (20.8 MP effective) and an imaging area of 23.9x35.9 mm. It's mated with Nikon's latest-generation 'Expeed 5' processor which allows for continuous shooting at up to 12 fps with continuous AF adjustment (14 fps with AF and AE locked to the first frame) and, importantly, 4K video recording. This processor noise reduction algorithms and the sensor's design enable a native sensitivity range equivalent to ISO 100 to 102,400 with expansion up to ISO 3,280,000 (a 'Hi.5' setting). Interestingly, when it comes to data storage, Nikon is offering two versions of the D5, one with dual XQD slots or one with dual CF slots (which provides UDMA-7 speed support). This overcomes the limitations of having one of each format.

The D5 gets both a new autofocusing system and a new metering system. AF is via a new 'Multi-CAM 20K' module which employs a total of 153 focusing points, 99 of which are cross-type arrays (55 and 35 manually selectable respectively). Fifteen points are still active with lenses as slow as f8.0, and there's a choice of seven area modes with a 'Quick mode' switching function. Continuous AF operations can be extensively customised to suit the type of subject movement. A new reflex mirror mechanism using a stepping motor allows for the shooting speed of 12 fps which can be maintained for a burst of 200 frames with continuous AF/AE adjustment. Metering is based on a new RGB-sensitive sensor which has 180,000 pixels and is labelled '3D Colour Matrix Metering III'. There's the option of multi-point, centre-weighted average (adjustable as on the D4S) and spot measurements, driving a standard set of 'PASM' exposure control modes. Auto bracketing functions are available for exposure, flash, white balance and Nikon's 'Active D-Lighting' correction for dynamic range expansion. The shutter now has a sensor-based 'first curtain" option for minimising vibration, while the physical shutter mechanism is tested to 400,000 cycles.

The D5's bodyshell comprises magnesium alloy covers with full weather sealing. The prism-based optical viewfinder gives 100 percent coverage and has a magnification of 0.72x. The LCD monitor screen is fixed, but has a resolution of 2.359 megadots and, importantly, touch controls. Interfaces include a stereo audio input and output (both 3.5 mm terminals) and a Type C HDMI connection which delivers an 'uncompressed' video feed for recording 2K/4K video to an external device (albeit still only 8-bit and 4:2:2 colour). The D5 records 4K video in the UHD resolution of 3840x2160 pixels (with no pixel-binning) and 8-bit MPEG-4/H.264 compression to give MOV format files. No bit-rates are currently quoted and there are also a couple of notable limitations here, namely a cropped sensor (actually only fraction larger than the 'DX' format frame, at 1.45x) and a very short clip length limit of just three minutes. Full frame video recording is only available in the Full HD or HD resolutions. Additionally, the D5 doesn't have the Cinema 4K resolution mode (i.e. 4096x2160 pixels) that's offered on the Canon EOS-1D C and most dedicated 4K video cameras (i.e. Blackmagic, Red, Panasonic, Sony, etc). While the step up to 4K video is welcome, the D5 remains very much a stills camera first and foremost, and its video offerings don't look quite so appealing compared to what else is on offer (especially among the higher-end mirrorless cameras).

Pricing for the D5 hasn't been unveiled, but it looks like selling for around US$6500 in the USA or 7000 Euros in Europe which could mean in the region of $9500 locally, putting it much closer to Leica's SL… the mirrorless camera that the Germans are touting as a pro D-SLR killer. Availability will be from March. For more information visit **www.mynikonlife.com.au**

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...AND SO DOES CANON

IT'S THE BATTLE of the big guns at the top-end of the D-SLR market as Canon follows Nikon's D5 with its own new flagship, the EOS-1D X Mark II. Designed to replace both the EOS-1D X and the more video-orientated EOS-1D C, the new camera again pushes the performance envelope for D-SLRs in both still capture and video recording.

The all-new bodyshell is similar in styling to that of the previous model, but with a pronounced 'hump' atop the pentaprism housing which contains a GPS receiver. Canon says the camera is largely hand-assembled by technicians who have achieved 'Meister' status and who, interestingly, are individually responsible for building, inspecting and testing an entire body themselves, rather than just being responsible for one stage or process. The Mark II is built around a full-35mm CMOS with a total pixel count of 21.5 megapixels and a native sensitivity range equivalent to ISO 100 to 51,200 with expansion to ISO 50 and ISO 409,600. The engine room is a pair of 'DiG!C 6+' processors which enable a continuous shooting speed of 14 fps with continuous AF/AE adjustment and up to 16 fps when using live view (but with AF fixed to the first frame). Not surprisingly, this has necessitated a redesign of the reflex mirror mechanism and, additionally, these speeds are only achieved by using a CFast 2.0 memory card. The -1D X Mark II has one slot for CFast cards and one for standard CompactFlash types. It's interesting to note here that Canon has opted for the CFast format rather than XQD as chosen by Nikon.

The new camera's dual high-speed processors also allow for 4K video recording in the Cinema 4K format of 4096x2160 pixels (versus the D5's UHD resolution) at 50 or 60 fps. Full HD video can be recorded at 120 fps for slow-mo effects. Also interestingly, Canon is providing a '4K Scene' mode which allows for the extraction of 8.3 MP stills (like Panasonic's '4K Photo' modes). Still on video, the new camera has built-in stereo microphones, but is also equipped with stereo audio connectors (input and output) and can deliver an uncompressed 4K/2K output (8-bit, 4:2:2 colour) to its Type C HDMI terminal. Autofocusing with video is performed via phase-detection measurements using an upgraded version of Canon's 'Dual Pixel CMOS AF' system.

Also upgraded is the camera's main AF system which employs 61 measuring points, 41 of them being cross-type arrays, including five dual cross-type arrays with f2.8 sensitivity. A total of 21 cross-type arrays are still operating at a lens speed of f8.0. Low light sensitivity extends down to EV -3.0 (at ISO 100). The -1D X Mark II also gets a beefed-up metering system which employs an 'RGB+IR' sensor with 360,000 pixels which generate 216 measuring zones.

The monitor screen is a fixed 8.1 cm 'Clear View II' LCD panel with a resolution of 1.62 megadots and which, in live view and video, provides touch controls, including focusing. Other notable features include a multiple exposure facility, anti-flicker detection, white balance bracketing, a fully-sealed magnesium-alloy bodyshell and compatibility with a new wireless transmitter called the WFT-E8 (but there isn't built-in WiFi).

Canon Australia expects the EOS-1D X Mark II to be available from mid-April and has indicated that it will be quite a bit more expensive than the EOS-1D X, perhaps with a price tag nudging $10,000 (and therefore closer to what the EOS-1D C was selling for). For more information visit **www.canon.com.au**

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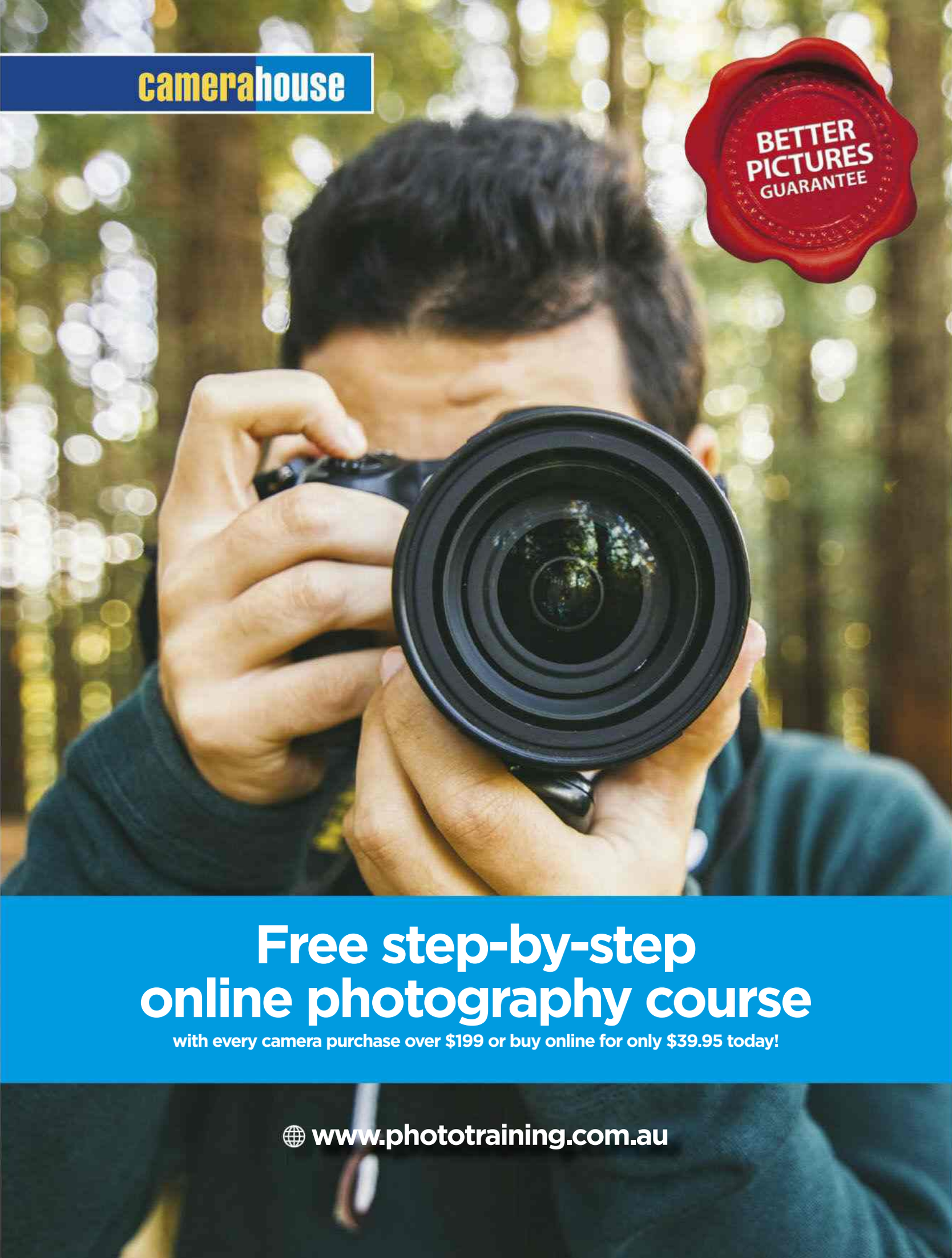
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OLYMPUS PAYS HOMAGE TO THE ORIGINAL PEN F

AH, OLYMPUS YOU never disappoint us! Any concerns that the Digital PEN series might be finished as Olympus increasingly concentrated on its highly successful OM-D line-up appear unfounded as the company launches its best compact mirrorless model yet.

The new PEN F pays homage to the half-frame 35mm SLR from 1963, arguably the camera which first established the Olympus brand in the minds of enthusiast shooters… especially as a maker of rather small, but highly-featured models.

Like its spiritual ancestor, the PEN F is elegantly styled with a high reliance on traditional dials for control. It features an all-metal bodyshell and is the first Digital Pen model to incorporate a built-in electronic viewfinder… an OLED panel with a resolution of 2.36 million dots. This is supplemented by a tilt/swing adjustable LCD monitor screen with touch controls and a resolution of 1.37 million dots.

Also new is a higher resolution 'Live MOS' sensor with an effective pixel count of 20.3 million and, most likely, the same device as is used in Panasonic's GX8. It's accompanied by Olympus's latest 'Truepix VII' processor which enables continuous shooting at up to 10 fps and Full HD video recording at 50, 25 or 24 fps (progressive scan). The PEN F also has Olympus's latest-generation five-axis sensor-shift image stabilisation, and the 'Hi-Res' shot mode – which also uses sensor shifting – to create 50 megapixels JPEGs or 80 megapixels RAW files.

The in-camera image processing functions available on the latest OM-D cameras – the 'Highlight & Shadow' and 'Colour Creator' controls – have been further expanded via a new 'Monochrome And Colour Profile' controller which is accessed via a front-facing 'Creative Dial'. The profile control provides user-customisable tone and saturation image presets which simulate the look of classic colour and B&W films. The monochrome profile mode even enables digitised 'film grain' to be applied to an image. Olympus says there's an increasing demand for more Photoshop-style adjustments in-camera as many more images are being uploaded directly while in the field, via WiFi, rather than after post-camera editing. The PEN F's 'Creative Dial' also provides quick access to the 'Art Filters' effects and the 'Colour Creator' adjustments.

In keeping with the style of the new PEN F, Olympus has released a range of bespoke accessories, including a limited-edition leather bag and a premium leather shoulder strap. An optional handgrip which cleverly incorporates an Arca-Swiss type tripod mounting plate is also available.

The Olympus PEN F is available in either balck or silver finishes and comes bundled with the compact FL-LM3 accessory flash unit. It's priced at $1799 for the body only or $1999 when packaged with the M.Zuiko Digital 14-42mm f3.5-5.6 powered zoom. For more information visit **www.olympus.com.au**

BRIEF EXPOSURES

While there's yet to be any formal announcement globally, it would appear **Samsung** has decided to exit the camera business after recording lack lustre results in most major markets, including Australia. The company had already announced at the end of 2015 that it would no longer be selling cameras in Europe and that the NX1 – undoubtedly its best mirrorless model ever – had been discontinued. This is apparently also the case in Scandinavia and, according to one report, Australia where some retailers have been told the NX System is finished. Samsung had been talking a big game in cameras for a while, but finally delivered with the excellent NX1 and its NX500 cousin. However, it appears neither were enough to turn the sector around sufficiently for Samsung. Another rumour suggests that the 'APS-C' NX platform has been discontinued to make way for a full-35mm system – in the light of Sony's huge success with the A7 Series – but frankly we think this is unlikely. Samsung can simply make better money in the many other CE segments where it is a key player; something that was never the case with cameras.

ALL-AROUND ACTION FROM NIKON

NIKON HAS ANNOUNCED its intention to compete in the ever-growing video 'action cam' sector and will launch a compact, rugged camera by mid-year. Nikon's KeyMission 360 – the first, says the company, in a series of products – features two lenses and sensors, located front and rear to give a single, full 360-degree image in the UHD 4K video resolution. The images generated by each of the lens-and-sensor pairs are combined in-camera to create a 'virtual reality' (VR) experience, but neither the sensor's resolution or type, nor the lens focal lengths, have been specified at present. The ruggedised and palm-sized camera body is waterproofed down to 30 minutes – so it's obviously also dust-proof – and shock-proofed to withstand a drop of two metres. It is also insulated to allow for operation in temperatures down to -10 degrees Celsius.

The KeyMission 360 has built-in WiFi with NFC connectivity so a mobile device such as smartphone or tablet can be used as viewfinder and controller. It also offers Nikon's SnapBridge 'always on' wireless file sharing via BLE (Bluetooth Low Energy). It also has a built-in microphone and electronic image stabilisation which can also be app-enabled applied during playback.

No other details of the Nikon KeyMission 360 are currently available.

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FUJIFILM SPRUCES UP THE X-E2

WHILE THE X-PRO2 has grabbed the main headlines, Fujifilm has re-issued its enthusiast-level RF-style mirrorless, now designated the XE-2s. The revised model has an upgraded autofocusing system – now with 77 points in the continuous Wide/Tracking mode – and a sensor-based shutter which allows for a top speed of 1/32,000 second and enables a silent shooting mode. As before, autofocusing is via a hybrid phase-difference/ contrast detection system. The sensitivity range now extends an extra stop to the equivalent of ISO 51,200. The Classic Chrome preset is added to the choice of 'Film Simulation' modes. The good news for owners of the X-E2 is that quite a number of these new features will be available via a firmware upgrade which is due later in the year. Externally, the new X-E2s has a reshaped handgrip and a new graphic user interface similar to the one introduced with the X-Pro2. Retained from the previous model is the OLED-type EVF with a resolution of 2.36 megadots, the 16.7 megapixels 'X-Trans CMOS II' sensor, fixed LCD monitor screen with a resolution of 1.04 megadots, maximum continuous shooting speed of 7.0 fps and built-in WiFi module.
The Fujifilm X-E2s is priced at $1399 with the Fujinon XF 18-55mm f2.8-4.0 R LM OIS zoom. Local availability is from March. For more information visit **www.fujifilm.com.au**

PHOTOGRAPHY EXHIBITIONS & EVENTS

Current to 22 May: Exhibition. *Imprint: Photography And The Impressionable Image.* Images which explore the association between photography and the sculptural cast, investigating the exchange between an object and its echo. Artists include Ingeborg Tyssen, Lewis Morley, Horst P Horst, Peter Lyssiotis, Juliana Swatko and Werner Rohde. Art Gallery of NSW, Art Gallery Road, The Domain, NSW 2000. Telephone (02) 9225 1744 for more information or visit the website at www.artgallery.nsw.gov.au Admission is free. Gallery hours are 10.00am to 5.00pm daily (open to 9.00pm on Wednesdays).

30 April – 6 June: Exhibition. *Head On Portrait Prize 2016.* At the Museum Of Sydney, corner Bridge and Phillip Streets, Sydney, NSW 2000. Gallery hours are 9.30am to 5.00pm daily. For more information telephone (02) 9251 5988 or please visit www.hht.net.au For more information about the Head On Photo Festival visit www.headon.com.au

3 – 15 May: Exhibition. *New Work.* Photographs by Anna-Marÿken – created using traditional film and processing – which reflect her traditional Dutch upbringing, as well as elements found in her self-constructed, real-time compositions from her immediate environment in the NSW Southern Highlands. At the Yellow House Sydney, 57 Macleay Street, Potts Point, NSW 2011. Part of the Head On exhibition program.

28 May to 4 September: Exhibition. *Tracey Moffatt – Laudanum And Other Works.* Photography series and video montages draw from the gallery's collection, including *Laudanum* 1998 and *Plantation* 2009. At the Art Gallery of NSW, Art Gallery Road, The Domain, NSW 2000. Telephone (02) 9225 1744 for more information or visit www.artgallery.nsw.gov.au Admission is free. Gallery hours are 10.00am to 5.00pm daily (open to 9.00pm on Wednesdays).

28 May to 18 September: Exhibition. *Cindy Sherman.* Showing for the first time in Australia and presenting a series of large scale photographs made since 2000 which feature Sherman dressed in a theatrical array of costumes. At the Queensland Gallery Of Modern Art (QAGOMA), Stanley Place, South Bank, Brisbane, Queensland 4101. Gallery hours are 10.00am to 5.00pm daily. Ticketed admission. For more information telephone (07) 3840 7307 or visit www.qagoma.qld.gov.au

20 – 25 September 2016: 2016 Photokina World Of Imaging. The world's largest exhibition of new imaging products and processes. At the Köln Messe, Cologne, Germany. Visit www.photokina-cologne.com for more information.

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NEW M-MOUNT LENS TRIO FROM LEICA

THREE UPDATED VERSIONS of popular wide-angle primes have been announced by Leica and will be available in Australia over the next couple of months. All have more robust constructions – including full-metal rectangular lens hoods and metal lens caps – and revised optical designs to optimise performance. All three are manufactured in Germany and feature compact designs to enhance their suitability for applications such as photojournalism and street photography.

The three models comprise a Summicron-M 28mm f2.0 ASPH and Summicron-M 35mm f2.0 ASPH, plus an Elmarit-M 28mm f2.8 ASPH.

The new 35mm f2.0 is available in either silver or black finishes (both priced at $4550) and has a seven-element optical construction with an 11-blade diaphragm for smoother out-of-focus effects. It has a minimum focusing distance of 70 centimetres.

Both the new 28mm models are available in black only. The f2.0 speed Summicron-M lens ($5700) has a nine-element construction which is claimed to achieve "ever better imaging performance across the entire image field". The minimum focusing distance is also 70 centimetres. The f2.8 speed Elmarit-M lens ($3100) has an eight-element optical construction and is the most compact lens in the current M-Mount system. The revised optics deliver a "significantly reduced" image field curvature combined with "brilliant resolution of details".

For more information visit the website at **www.leica-camera.com**

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FUJIFILM UPGRADES PRO MIRRORLESS CAMERA

THE MUCH-ANTICIPATED successor to Fujifilm's X-Pro1 has finally arrived and the good news is that the basic formula of an RF-style camera with a hybrid optical/electronic viewfinder remains unchanged. However, the new X-Pro2 incorporates revisions to just about every element of its design, including its control layout. At a press preview of the X-Pro2, a Fujifilm representative commented, "It looks the same, but basically we've changed everything". Quite a number of the updated or new features are carried over from the current X-T1 and X-E2 models while some are exclusive to Fujifilm's new professional-level model.

On the inside, the X-Pro2 has a new version of Fujifilm's proprietary filter-patterned 'APS-C' format sensor called the 'X-Trans CMOS III' which has an effective resolution of 24.3 megapixels and a sensitivity range equivalent to ISO 100 to 12,800. It's mated with a new 'X Processor Pro' data processor which allows for continuous shooting at up to 8.0 fps. Fujifilm claims a start-up time of 0.4 seconds, a shooting interval of 0.25 seconds, a shutter time lag of 0.05 seconds and a fastest AF speed of 0.06 seconds. The X-Pro2 has a hybrid contrast/phase detection AF system which employs 273 focusing points (169 of them for phase-detection measurements). The number of manually selectable focusing points has increased from 49 on the X-Pro1 up to 77, and the new camera has the same 'Zone' (i.e. area) and tracking modes as the X-T1 running the current firmware upgrade.

The X-Pro2 has a new and faster shutter mechanism with a top shutter speed of 1/8000 second (and flash sync speed up) 1/250 second, and an increased durability of 150,000 cycles. The camera also has a sensor-based electronic shutter which allows for silent operation and a maximum speed of 1/32,000 second. New features include a new 'Film Simulation' preset called Acros for B&W images with increased detailing, multiple bracketing modes ('Film Simulation', AE, ISO, white balance and dynamic range), an intervalometer, a 'Grain Effect' function (with Weak or Strong settings) and dual slots for SD format memory cards with UHS-II speed support.

The X-Pro2's bodyshell comprises of four magnesium alloy sides with a total of 61 weatherproof seals and insulation to enable operations in temperatures as low as -10 degrees Celsius. As on the other high-end Fujifilm X Series cameras, the main control dials are milled from solid billets of aluminium. The control layout now includes both front and rear input wheels and a joystick for faster selection of the AF points.

The ISO selector is integrated into the shutter speed dial and is set by lifting and turning until the desired value is shown via a small window – an arrangement popular during the 1960s and '70s. The 7.62 cm LCD monitor screen has an increased resolution of 1.62 megadots and refresh rate of 60 fps. The updated 'Advanced Hybrid Multi Viewfinder' incorporates a new EVF component with a resolution of 2.36 megadots and features such as the 'Electronic Rangefinder' which was introduced on the X100T. This displays as a small EVF window in the optical finder enabling the checking of focus, angle-of-view, exposure and white balance in real-time; while even the video feed can be displayed.

The X-Pro2 records Full HD video at 50, 25 or 24 fps with stereo sound, and has a built-in WiFi module. It's priced at $2699 body only with local availability from early April. For more information visit **www.fujifilm.com.au**

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ALL THINGS BRIGHT AND BEAUTIFUL

DR CHRIS BROWN

He's one of the busiest personalities on Australian television at the moment, but this hasn't stopped celebrity vet Dr Chris Brown finding time behind the camera to pursue his long-held love of photography.

INTERVIEW BY PAUL BURROWS

All photographs by Chris Brown, copyright 2016.

IN THE FLESH Dr Chris Brown is even more engaging than his on-screen personality. Believe it or not, he's even better looking and more charismatic, but in a completely natural sort of a way. He exudes an infectious enthusiasm, seems genuinely comfortable in his own skin and laughs a lot… a whole lot. No wonder then that he's got a full dance card as far as his television commitments are concerned.

We manage to cram in an interview just before the Christmas break when he had a few very precious days off before diving headlong into the hectic schedule of filming the new series of *I'm A Celebrity… Get Me Out Of Here!* which he co-hosts with comedian and actor Julia Morris. *I'm A Celebrity* is probably proof that Chris Brown doesn't take himself all that seriously, but while it no doubt pays well – and certainly doesn't hurt his profile – the big attraction for the vet-turned-TV-star is the show's South African location which allows him to combine his two great loves… animals and photography.

The hugely successful series *Bondi Vet*, first shown in 2008, brought Chris to national (and international) prominence and he's subsequently been involved with a variety of TV programs, including the lifestyle show, *The Living Room*, where he presents segments on pets and travel… another great passion as it provides more opportunities for photography.

Chris says he has always had a camera and loved taking pictures, starting from when he was about five or six.

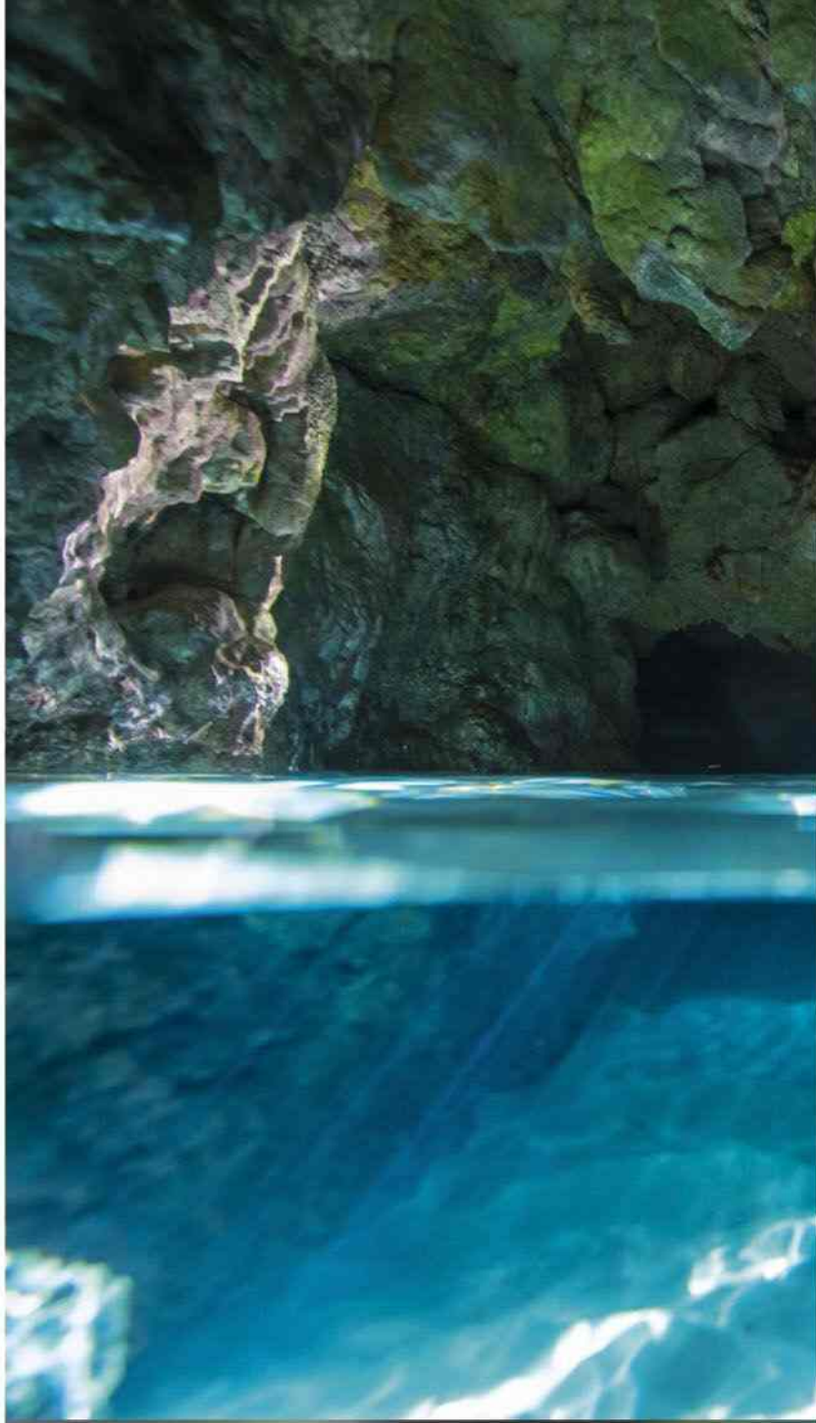
"I've always been drawn to 'the little magic box' that is the camera. As a young child I remember borrowing Mum's camera and chasing the pets around the house… and her around the house. I was asked the other day whether I remembered my first photo. Well, I certainly remember my first roll of film because it's become quite infamous in our family. I was so excited I'd been running around taking shots of everything and, at the end, I burst into the bathroom and took a photo of Mum in the shower. Now, of course, the film had to be developed at the local chemist and our local chemist used to flash up the shots as they were being developed… and this was our local chemist that Mum had to go to for our medications and other things! She could never go back… so I kind of ruined an integral part of our family's community with that one shot!"

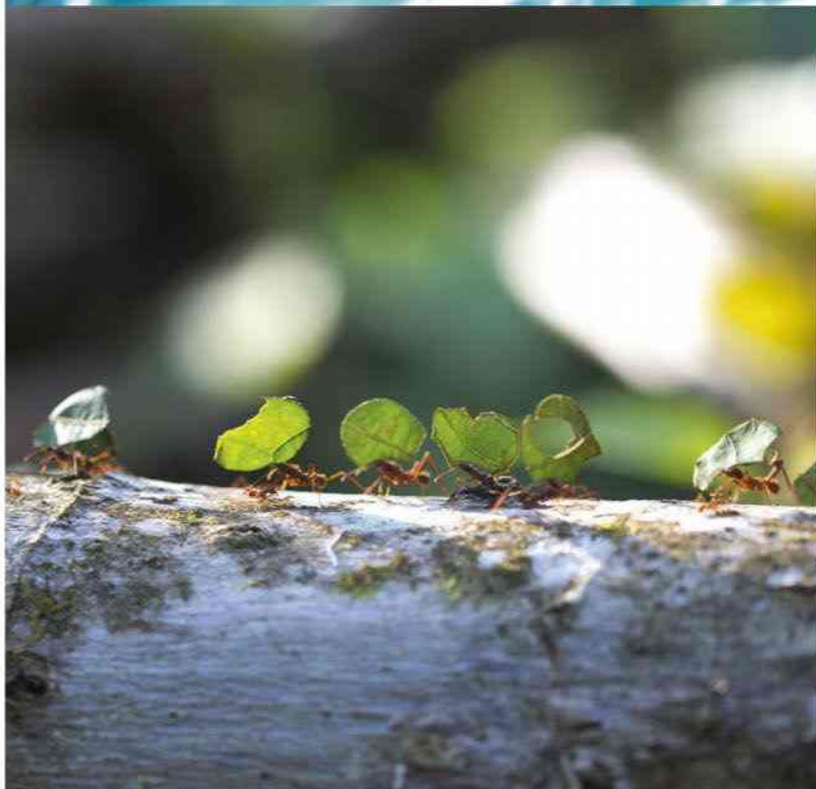
"Thankfully," says Chris Brown, "I didn't end up becoming a paparazzi photographer."

Different Eyes

Despite developing other interests and priorities as a teenager, Chris says he's always had a camera and always taken photographs.

"Whether I used it a lot or just a little, it's always been there. I guess I've always had two passions – it's been animals which has flowed on into my career and also landscapes. I just really enjoy taking landscape shots. I love the fact that it makes me appreciate the world around me even more and it makes me look at it through different eyes. With the camera, you see it in a different way to the way you sometimes see it and just take for granted. Now I obsess over light, and I obsess over the time of day, and colour and the movement of water… all those





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Photograph of Chris Brown by Paul Burrows, copyright 2016.

little things that you'd otherwise miss. And, as a photographer, you have to work with all these things so that they become your friends and, I guess, on occasions your enemies when they get in the way of something. But you look at them and you appreciate them and you become a connoisseur of them… and I like the fact that it makes me more aware of what's around me."

As it happens, though, animals and photography do go together pretty well, don't they?

"They do. They do. My big philosophy is that every animal has a personality and I think I'm fortunate in my job that I get to spend a lot of time with them and get to know that personality… and, with photography, my challenge is always to bring out some of that personality."

And Chris says he likes all animals from African 'big game' to domestic pets.

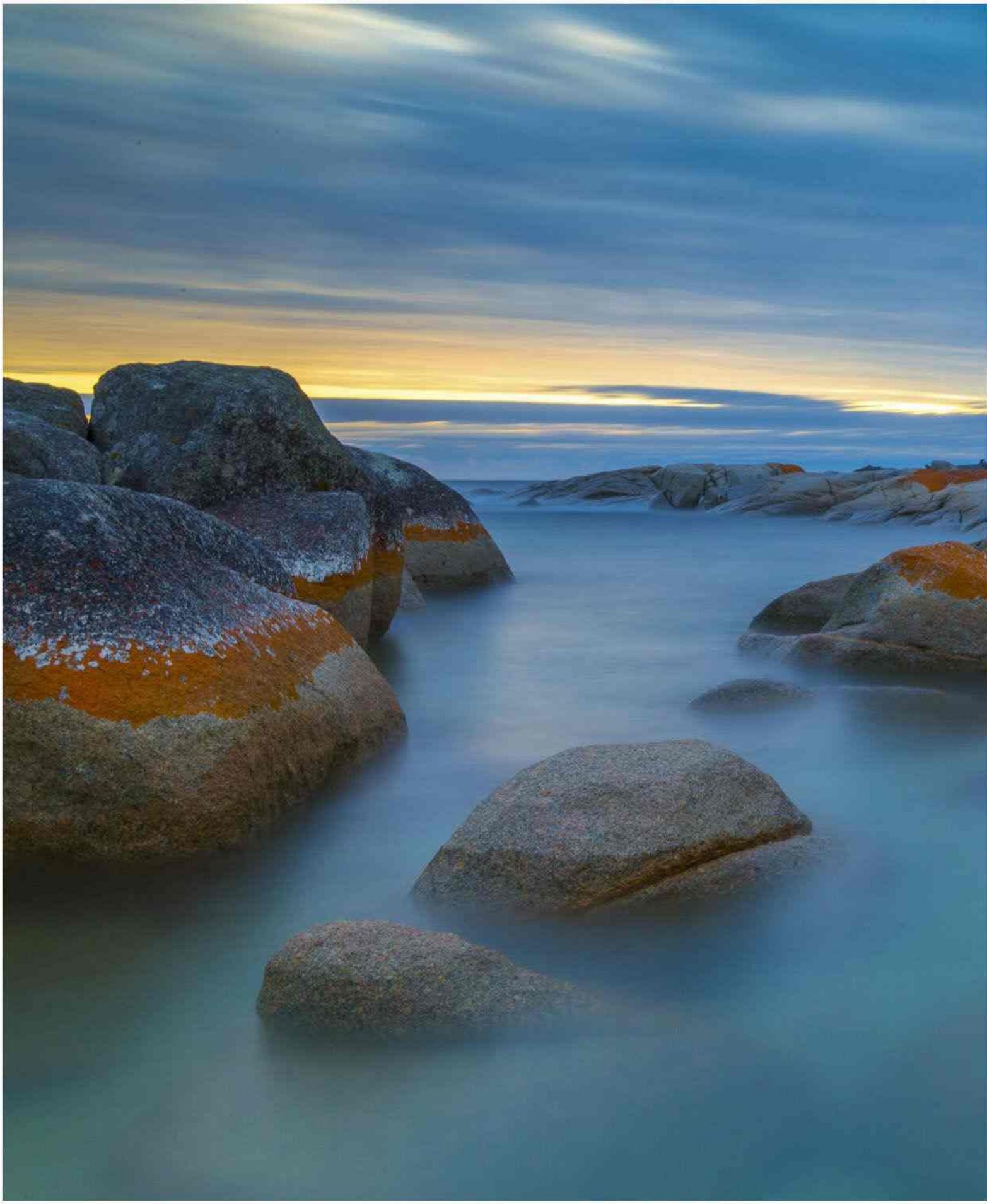
"They've all got their own little quirks," he observes. "And their own challenges photographically. But I do think there's something beautiful in the idea of having

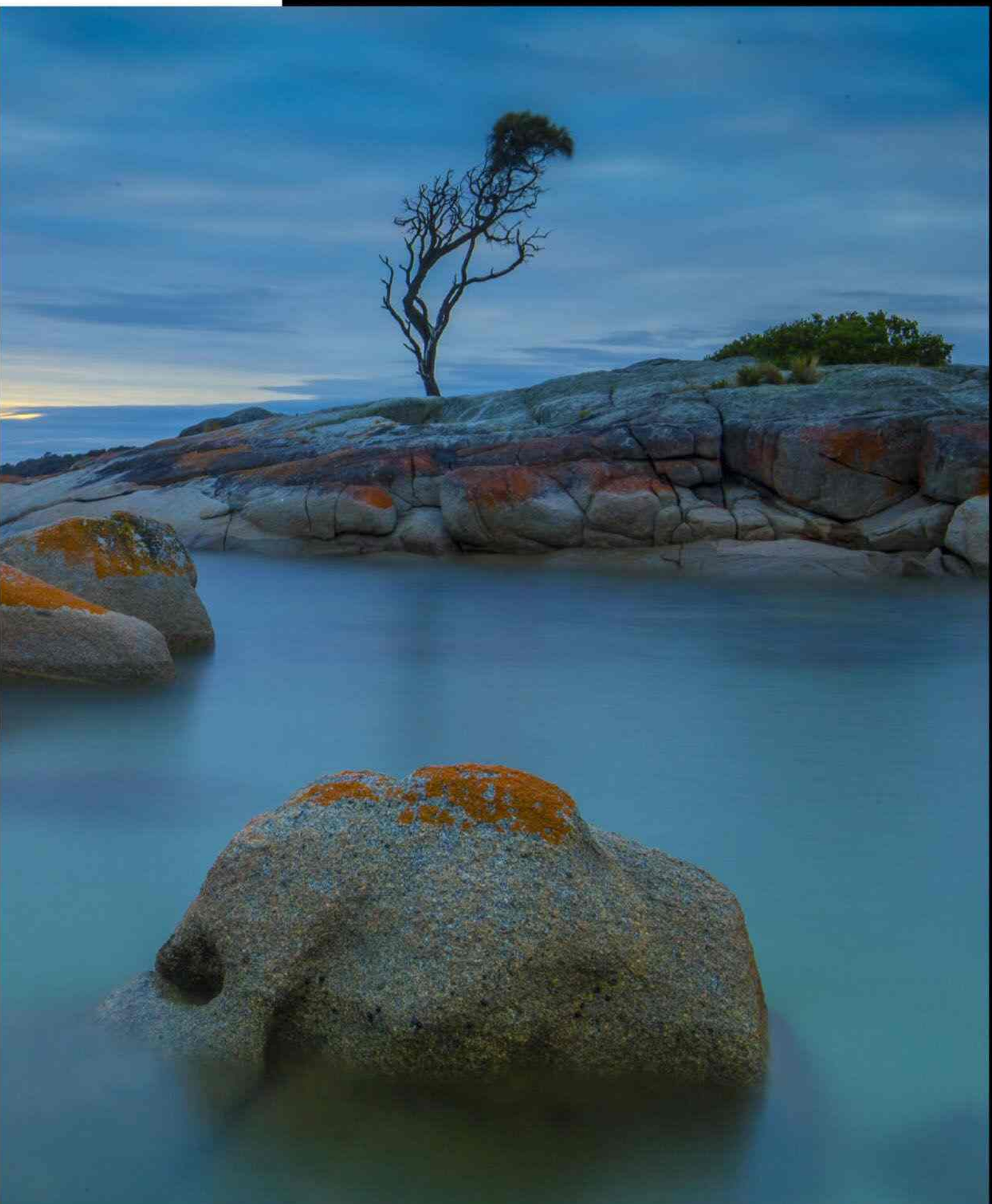
> ***"I prefer to keep it all fairly true and just play with the colours to bring them to where they should be. I dunno, I'd kind of feel like I was cheating if I changed the actual structure of the shot.***

many obstacles and difficulties in getting a shot. It's always the ones that didn't come easy that you're the most proud of."

Inevitably, of course, we have to bring up that the old showbiz adage about never working with children… or animals.

"I often hear that statement and, for starters, if it was true then





I wouldn't have a job, but I think animals are the greatest subject matter because they don't follow a script and provided you're open to capturing – and embracing – of whatever they're going to give you then you'll always get something unexpected. And that's the most exciting part."

Photo Opportunities

Chris's TV schedule is ridiculously busy and he's on the road for much of the year, but he still manages to engineer opportunities for his photography when working on a program.

"It can be hard. But I guess the fortunate thing is that, with TV, we normally shoot from nine to six in bright light. They rarely use the 'golden hours' at either end of the day, and so it can work in quite nicely. It just means getting up a little bit earlier and so potentially looking a bit more dishevelled when you're actually on camera for the job you're meant to be doing there. For me, it's such a pleasure being in these different places around the world that I always like to bring home a few images of my own rather than always being on the other side of the lens."

But having developed and refined his own eye for a great image, is Chris ever tempted to give his camera crew some advice about how to frame up a shot?

"We actually talk a lot. The cameraman [on *The Living Room*] and I have a really good relationship. He teaches me a few little things and I'll give him a few tips on locations. So, quite often, the locations that I've heard about and I'm interested in shooting for stills, we'll end up shooting parts of the story there simply because I've found these places and then seen where some of the best spots are."

And, "…probably because the bosses have decided to work with it rather than against it…" *The Living Room* is allowing him to do more photography stories this year, visiting particular locations to find out the best ways to photograph what's there.

"Photography is so big now for our audience, and the way we're doing these pieces is a bit like what people try to do when they go on holidays to a particular location. We're showing them how we would go about it and so hopefully they'll learn a thing or two that will help them get the shots they want."

Prime Time

Asked whether he was an enthusiastic embracer of digital imaging, Chris Brown thinks for a short while before answering.

"No, I hung on [to film] for a little while, but then I had a few film disasters – rolls that weren't developed correctly and other problems – and so, in the end, I didn't really need too much convincing to go across. But, at times, I do still miss the warmth of film, but the convenience of digital is just mind-blowing. When you're doing stuff for TV it's very important to know that you've got what you need."

Chris currently shoots mostly with a Canon EOS-1D X and now also has an EOS 5Ds R, "…but the 1D X is my standard. I shoot a lot of low-light stuff and I really love the way it handles that without too much grain. That's why it's got me". He's also enjoying the 50 megapixels resolution of the 5Ds R as it delivers significantly increased amounts of superfine detailing in elements such as feathers and fur.

"With animal shots, in particular, being able to really crop in on little features or textures is really exciting. You can almost create a tactile response to these images."

Chris's preference is for prime lenses, with a particular favourite being Canon's EF 35mm f1.4 L Series wide-angle which he describes as "the lens I get the most joy out of".

"It's a landscape lens, but I also love the way it puts animals in their location because it's wide enough to do that and has that depth-of-field as well. Probably the biggest thing I've learned recently is to pull back and try to put an animal into a scene to allow it to tell a story. Since I've been doing that more, I feel my animal shots have got a lot better. And that's what I like about this lens; it does let you to place them and allows the environment to tell a bit of the story. And that's the main goal of photography for me… to tell a story with an image."

Little Passions

While he's keen to start making prints of his favourite pictures – "I now have a house full of empty walls" – limited time means that Chris mostly shares his work online, including Instagram.

"But, to be honest, 80 percent of the pleasure I get from photos is really just personal. It's just me being able to look over them and having a memory. My crew always

All photographs by Chris Brown, copyright 2016.

I love the fact that the camera makes me appreciate the world around me even more and it makes me look at it through different eyes.

laugh at me whenever we're on a flight because they'll be sitting there watching movies, and I'll be hunched over my laptop fussing over my images, trying different crops and just seeing what really works the best.

"A lot of people get amusement out of my little passions. If I commit to a shot, I'll really commit to it. And I'll have an idea in my head about what I want and how I'll go about it."

To illustrate the point, Chris relates an incident that happened when he was on assignment in Canada for *The Living Room*. He wanted to shoot a sunset from quite high up in The Rockies, particularly as the smoke blowing in from bushfires in the USA was creating really dramatic skies.

"I got the chairlift up to the top, but miscalculated the time of the sunset so I was up there about three hours early. I walked around for a while and took a few other shots, but still needed to wait around so I sat on a rock and, because I was still a bit jet-lagged, I fell completely asleep. And I then remember being woken up by these hikers as one said loudly to another, 'Oh my God! Is he alive?' And they actually came over to check that I was still actually in this world. So, in my half-asleep state, I had to explain to them that I was waiting to take a photograph."

And yes, he did get the picture. "It was worth the wait."

> ***Animals are the greatest subject matter because they don't follow a script and provided you're open to capturing whatever they're going to give you, then you'll always get something unexpected.***

Keeping It True

As Chris puts so much effort into getting a shot, is he an in-camera purist or does he do a lot of work on his images post-camera?

"I shoot with a really flat profile so I can adjust it later on. But my attitude is that, as long as you bring it back to the way your eye saw it, then that's OK. That's my rule. It certainly looks a lot flatter off the camera than the way I saw, but that's very deliberate because I think it gives a more true colour representation if you then bring it back from there.

"I prefer to keep it all fairly true and just play with the colours to bring them to where they should be. I dunno, I'd kind of feel like I was cheating if I changed the actual structure of the shot. And I think that composition is part of the art – and part of the beauty of it – for me… and trying to position yourself to get everything in the right place. It's amazing just the subtle differences that a foot in camera height will make, or a foot either side will make. And getting into that perfect spot is what I enjoy and what I fuss over. In Tasmania recently I ended up waist-deep in five-degree water because I knew that that was the only spot I could be to get the shot I wanted."

Chris Brown has now travelled very widely around the world, but he says that there are still quite a few places on his 'bucket list'.

"Quite a few actually. I've never been to Antarctica. I've never been to the Galapagos. I've never seen the Northern Lights… or the Southern Lights. Because I spend the vast majority of the year working, I'm heavily influence by where work sends me for other things, but in my free time I go on a few little trips. Last year I went to Ecuador and to Greenland. I choose my holiday destinations around where I can get some good shots."

And, after animals, landscapes are the subject that actually stimulate him the most, although he also finds being out on location – and on his own – helps recharge his creative batteries.

"It's my quiet time," he states. "That's why I really enjoy being out in nature, in the middle of nowhere and being so far removed from everything else. To be honest, shooting portraits feels very similar to what I do work-wise. I just like that quiet escapism that landscape photography allows me."

All photographs by Chris Brown, copyright 2016.

DR CHRIS BROWN

PHASE ONE
FX

REPORT BY PAUL BURROWS

Five years in the making and a huge financial investment, Phase One's XF is the first 'clean sheet' modular medium format SLR platform since Hasselblad's H1 was launched back in 2002.

HIGHER ORDER

If you didn't spend your spare fifty grand on, say, a shiny new Holden Commodore (before they run out), how about splurging it all on one camera? Well, it's no ordinary camera. Welcome to the pointy end of the digital medium format market.

Most photographers who buy Phase One's XF are going to be putting it to work which is how they can contemplate spending anywhere from $30,000 to well over $50,000, depending on which model of capture back is fitted. And that's just with a standard prime lens. If you want something more exotic – like the fabulous new Schneider-Kreuznach 35mm f3.5 leaf-shutter wide-angle we had for this test – be prepared to start adding more big numbers (close to $9000 in this particular case). But it's all relative, especially if you have big clients who need you to deliver optimum quality files and don't mind paying for them.

Phase One's XF is particularly interesting because it's the first new 'clean sheet' modular medium format SLR camera system since Hasselblad's H1 back in 2002… and that was before there really was such a thing as digital medium format. Of course, Leica's S2, launched in 2008, was also a new design,

but actually has a smaller sensor and an all-in-one body design.

Until now Phase One has been making do with successive (minor) upgrades of the Mamiya 645AFD which dates back to the late 1990s. To be frank, this particular Mamiya platform was never really much to write home about – unlike the film-era greats such as the RB67 or the original M645 – and Phase One realised that its ever more capable capture backs weren't getting the front end they deserved. Developing any new camera is an expensive exercise, but it's even more so when you're only going to sell a comparatively small number each year so the XF represents a big investment in the future of digital medium format photography… and also a big vote of confidence. And to make sure it's able to do things the way it wants to, Phase One has recently completed the full purchase of Mamiya – it previously had part-ownership – which includes the Japanese manufacturing facility where the XF is built.

While both Leica and Pentax also market digital medium format cameras, Phase One's chief rival is another Scandinavian company, Hasselblad. Both offer modular camera systems based on the classic box-form body – originally devised, of course, by Victor Hasselblad in the late 1940s – but the Mamiya-based Phase Ones were falling behind the digital 'Blads, chiefly in terms of the integration that's possible between the capture back and the camera body, but also in convenience features such as detailed on-camera LCD info displays. Additionally, the Hasselblads offer the all-important capacity – in pro camera terms – to interchange viewfinders so the eyelevel prism can be replaced with a traditional waistlevel hood which is often especially useful in the studio situation.

And it's worth noting at this point that while Hasselblad's later digital medium format platforms have been technically more advanced than the Mamiyas, from the H3D to the current H5D, the company's 'closed loop' policy has meant that they haven't been available to the users of Phase One's backs (or, for that matter, anybody else's). There's now the 'open' H5X body, but the level of integration that's possible with non-Hasselblad backs is still an issue so clearly Phase One – without any heritage as a camera maker – needed to do something to ensure future competitiveness.

MAKING IT WORK

Starting from scratch, Phase One has been able to fulfil a number of the wish lists from its existing users as well as creating a platform that's more than capable of matching it with the current – and, more than likely, future – Hasselblads.

Some aspects of the XF are endearingly old school – including the styling – and some are absolutely contemporary, including a high degree of future-proofing via provisions for extensive firmware upgrades. Additionally, Phase One's latest generation of IQ3 series capture backs – released at the same time – fully leverage the XF's capabilities via an exceptionally high level of integration (more about these shortly).

The XF's angular and edgy styling is more reminiscent of Mamiya's RZ67 than anything else, although the Phase One actually isn't quite as bulky. Nevertheless, it's still quite heavy thanks to the beefy prism finder and the fact that all the external covers are made from aerospace-grade alloys. It feels in a very different league to the outgoing 645DF+ body. The Mamiya 645AF lens mount is retained, but beyond this the camera is all Phase One's own work, including the autofocusing system. The 90-degree prism viewfinder is fitted as standard, but can be interchanged with an optional waistlevel finder which, in particular, can be more desirable in some studio

THE XF+IQ3 COMBINATION IS NO MORE DEMANDING TO USE THAN ANY PRO-LEVEL FULL-35MM D-SLR AND, ALTHOUGH PHILOSOPHICALLY QUITE DIFFERENT, COMPARABLE TO THE PENTAX 645Z.

IQ3 backs have a simple, easy-to-navigate menu system. Integration with the XF allowing for the camera's control panel to be replicated here too.

Capture review options include a histogram, guide grids and highlight warning (which can be set to a desired level). Not shown here is a novel 'Exposure Zone' coloured overlay and selected clipping warning display to supplement the highlight warning.

situations. The scene coverage is 97 percent for both, and the autofocusing is body-based so remains available regardless of the camera's configuration. The prism finder incorporates both a flash hotshoe and a PC terminal and, interestingly, the XF incorporates a Profoto 'Air' transmitter for remote radio-frequency triggering of the Swedish company's flash units. A nice little piece of Scandinavian co-operation.

The XF boasts a good-sized handgrip atop which is one of its cleverest features… a large display panel with a capacitive touchscreen which works brilliantly in the field. There are three input wheels – similar to a Sony Alpha 7 series body – which are essentially used to set apertures, shutter speeds and the ISO, and can be configured to do any of these operations. The direction of each wheel's rotation can also be changed, but they can also be locked to avoid accident adjustment. The control/display panel – which Phase One calls the "One Touch UI" – is accompanied by a pair of long, rectangular buttons which can be used for more conventional selecting and setting duties (if desired, the touchscreen operation can be turned off). In fact, all the XF's external controls can be customised with the settable functions including autofocusing, the AE lock, mirror lock-up and depth-of-field preview. The display itself can be switched between 'Simple' and 'Classic' layouts – the latter being more comprehensive – or customised more specifically and there's adjustable backlighting to vary the brightness. It's also a multi-coloured display so, for example, out-of-range indicators are shown in red and any auto settings (i.e. apertures, shutter speeds, etc) are shown in blue. Furthermore, the degree of integration with IQ3 backs – made possible by a new "High Bandwidth" interface – allows for the whole panel to be replicated in their monitor screens… obviously again with touchscreen controllability which even includes shutter release.

The XF is powered by the same 3400 mAh BP-series lithium-ion battery packs as the IQ3 backs which enables a handy 'Powershare' facility should one or the other fail mid-shoot. The flat battery can be replaced without the system switching off (but it won't operate with just one battery). Either component's on/off button powers up both

The XF incorporates a completely new autofocusing system – developed in-house by Phase One – and based on a dedicated one-megapixel CMOS sensor.

components. There are also two shutter release buttons on the XF body; one conventionally located atop the handgrip and the second, more classically, positioned alongside the base of the lens mount where it's designed primarily for use with the waistlevel finder and low-level shooting.

WORKER BEE

On the inside, the XF has a new TTL autofocusing system based on a one-megapixel CMOS sensor designated the HAP-1. As on the H5D, autofocusing is still only based on a centralised zone in the viewfinder, but Phase One's in-house developed 'HoneyBee Autofocus Platform' (HAP for short) is its answer to Hasselblad's 'TrueFocus' in terms of delivering enhanced accuracy and speed.

The principle is different, but the intent is the same; namely to make the autofocusing work as efficiently as possible so, within this central zone, there are actually 1000 'floating' measuring points with the option of setting Spot, Average or Hyperfocal AF modes. As the name suggests, this last mode allows for the autofocusing to be fine-tuned to optimise depth-of-field by focusing on the lens's hyperfocal point rather than at infinity. Additionally, focus calibration is available for up to 32 individual lenses – by serial number with the later models – to correct for any front- or back-focus variations.

Low-light AF assistance is provided by a built-in 'Precision White Light' illuminator which has a brightness adjustment

When the waistlevel finder is fitted, the HAP-1 sensor provides not only autofocusing, but also spot metering so auto exposure control is retained. Matrix (i.e. multi-zone) and average metering modes are available via the prism finder. The XF has a full set of 'PASM' exposure control modes backed by an AE lock, up to +/- 5.0 EV of compensation and auto bracketing over sequences from two to five frames. Usefully, the auto setting ranges for apertures, shutter speed and ISO can be limited to a preset maximum and/or minimum so, for example, a lens's largest or smallest apertures can be locked out or very slow speeds avoided when shooting hand-held.

The XF body incorporates a focal plane shutter with a top speed of 1/4000 second while timed long exposures of up to 60 minutes are possible (and supported by the IQ3 backs). Flash sync is at all speeds up to 1/125 seconds, but the Phase One lens system includes a growing selection of leaf-shutter types from Schneider which enable a maximum sync speed of 1/1600 second.

There's a 'Vibration Delay' mode which can be preset from 0.5 to 8.0 seconds for shutter release after the mirror has been locked up. Commendably, mirror lock-up now remains engaged until it's switched off so it doesn't have to be re-activated after each exposure. Rather sexier is the 'Seismograph' mode which locks up the mirror (and locks open the focal plane shutter with LS lenses) and then uses the camera's built-in six-axis gyros and accelerometer to determine when all vibrations have died away sufficiently to allow automatic shutter release. The seismograph function also shows how much the camera is vibrating which can be a bit of a revelation for anybody who thought that their tripod was very sturdy and hence stable.

Phase One says that additional facilities based on the gyros and accelerometer will be provided in the future via firmware upgrades,

SOME ASPECTS OF THE XF ARE ENDEARINGLY OLD SCHOOL AND SOME ARE ABSOLUTELY CONTEMPORARY, INCLUDING A HIGH DEGREE OF FUTURE-PROOFING VIA PROVISIONS FOR EXTENSIVE FIRMWARE UPGRADES.

but right now they also drive a 'Virtual Horizon' display that's selectable in an IQ3's monitor screen.

BACKS TO WORK

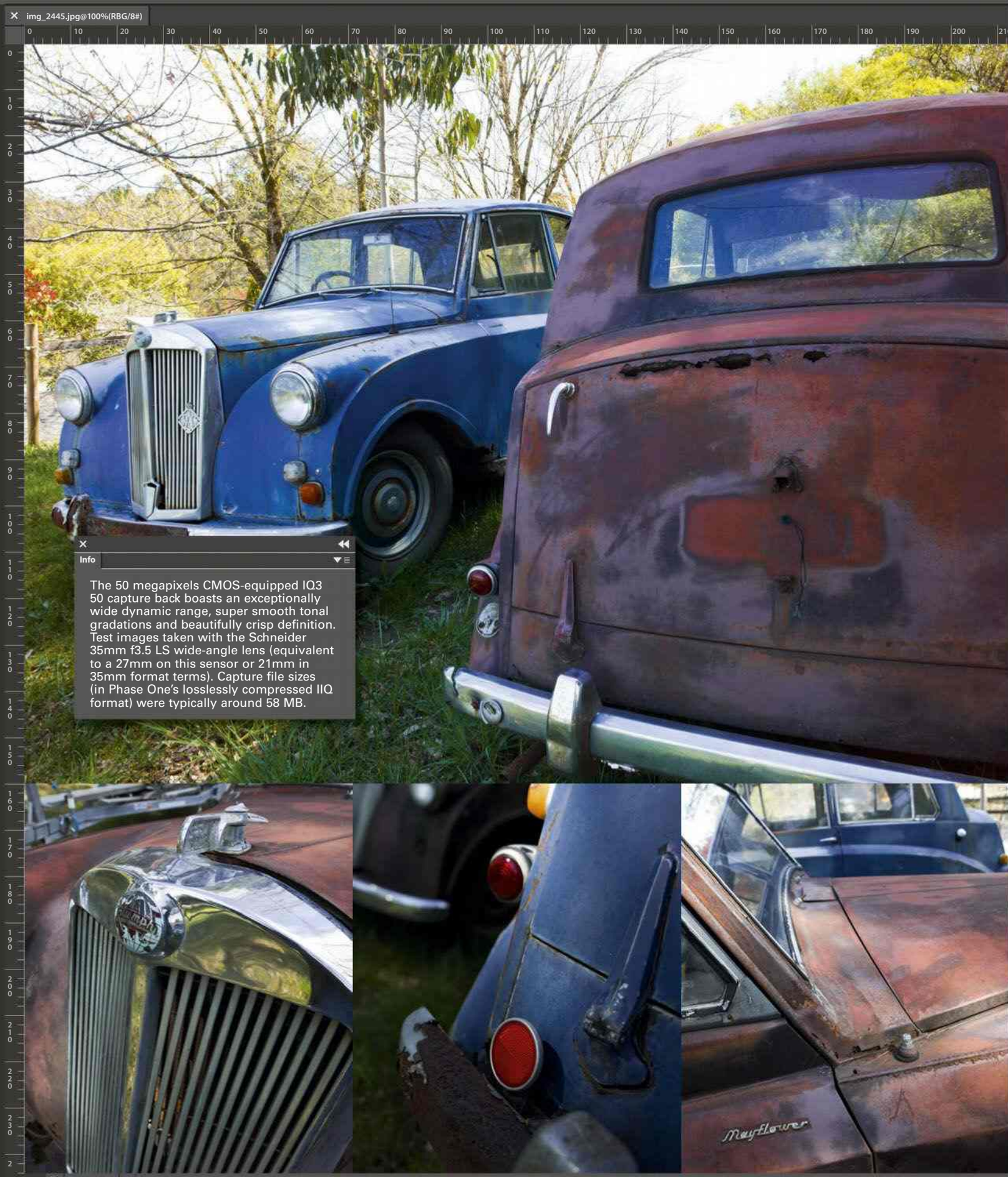
The IQ3 capture backs have essentially the same specifications as the IQ2 series, but have been designed to fully integrate with the XF via the new interface mentioned earlier. There are three models – two with CCD-type sensors and either 60 or 80 megapixels resolution, and one with a 50 MP CMOS.

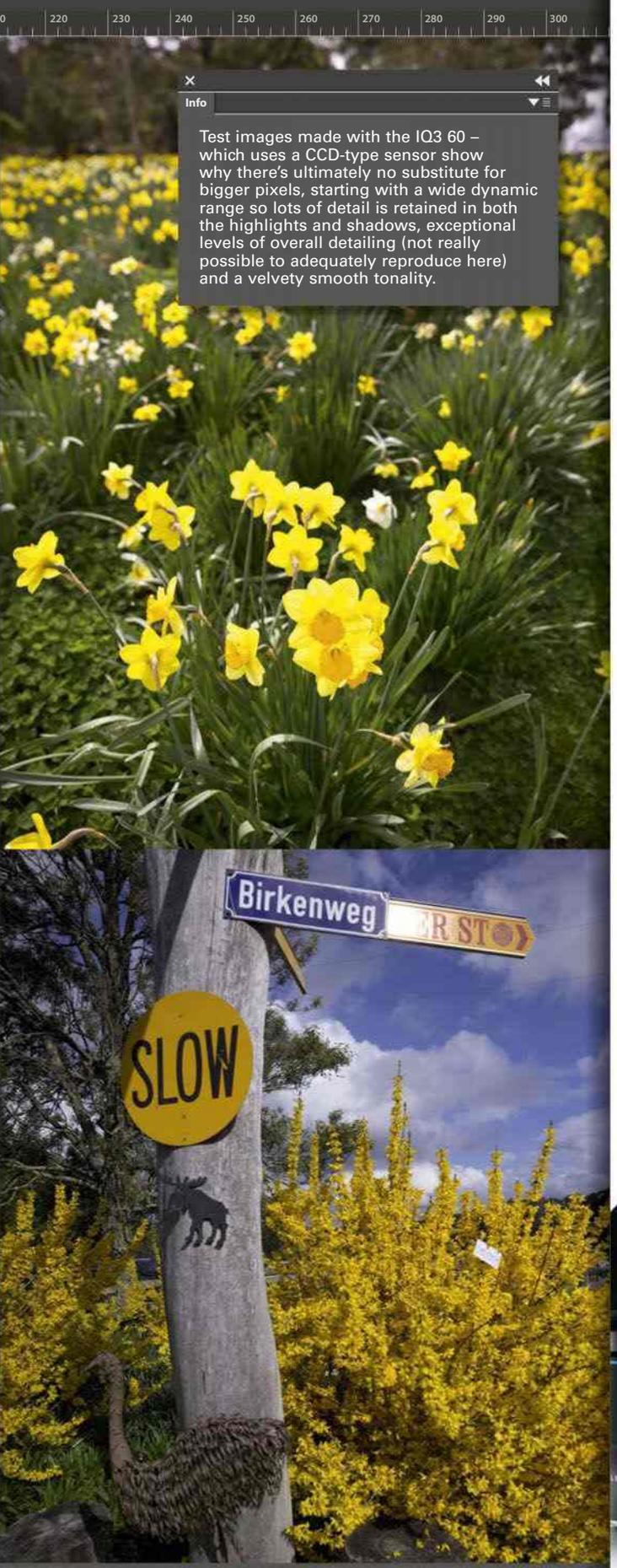
There are some notable new features, starting with the 'Exposure Zone' tool which overlays a captured image with a range of colours that indicate zones of under- and overexposure in specific values. It's essentially the same idea as highlight/shadow warnings, but a whole lot more sophisticated and allows exposures to be then more precisely fine-tuned as per the area indicated by a specifically coloured zone.

Also very neat is the 'Temperature Graph' which maps the temperature of the sensor over time so it can be allowed to stabilize prior to commencing an exposure. This is especially important now that exposure times of up to 60 minutes are possible. The 'Exposure Calculator' tool is also primarily designed for low light or night photography. After a preview is captured at a high ISO with a large aperture, the calculator then determines the exposure times required at lower sensitivity settings and/or smaller apertures.

There's also an enhanced 'Exposure Warning' facility which allows the highlight warning level to be set, along with its colour, plus a clip warning with its specific colour too. Both the IQ2 and IQ1 series backs can be used on the XF – but require a firmware upgrade

Single memory card slot accepts UDMA-7 speed compliant CompactFlash devices.


img_2445.jpg@100%(RBG/8#)
Info
The 50 megapixels CMOS-equipped IQ3 50 capture back boasts an exceptionally wide dynamic range, super smooth tonal gradations and beautifully crisp definition. Test images taken with the Schneider 35mm f3.5 LS wide-angle lens (equivalent to a 27mm on this sensor or 21mm in 35mm format terms). Capture file sizes (in Phase One's losslessly compressed IIQ format) were typically around 58 MB.
Mayflower
100%
Doc: 2.8mb



– but obviously none of the facilities that depend on the 'High Bandwidth' interface are available, including power sharing. However, an upgraded IQ2 back will support the XF camera controls in their monitor screens and gain selected IQ3 features such as the 'Exposure Zone' tool. At this point, the XF doesn't support the IQ2-based Leaf Credo backs, but backwards compatibility allows the IQ3 backs to be used on the Phase One 645DF/ DF+ camera bodies.

PERFORMANCE

The XF immediately scores highly for both its handling and efficiency of operation. It's a big camera, but the well-shaped grip is very comfortable and the XF feels well balanced even with a big lens like the new Schneider-Kreuznach 35mm f3.5 LS wide-angle fitted. Hand-holding really is quite feasible, both in physical terms and how the camera's ergonomics… most notable, the touchscreen controls.

Operationally, it's chalk and cheese compared to the previous Mamiya-sourced bodies and, while Hasselblad also offers a more contemporary front/ rear input wheel control arrangement, Phase One goes a lot further. The XF's third wheel additionally makes ISO setting immediately accessible, but the touchscreen does the same for everything else, and it's completely intuitive to master. It's also highly addictive to use, while the option to doing everything from the back's screen means the same level of speed and efficiency is available regardless of how the camera is being used. The prism finder is truly fabulous while the new feedback features of the IQ3 backs – especially the 'Exposure Zone' overlay – are very helpful and any subsequent fine-tuning is very quickly and easily applied. The impression here is very much of a 'total package' design approach with everything working in harmony to achieve the desired outcome as efficiently as possible. Consequently, the XF+IQ3

"THE XF BOASTS A GOOD-SIZED HANDGRIP ATOP WHICH IS ONE OF ITS CLEVEREST FEATURES… A LARGE DISPLAY PANEL WITH A CAPACITIVE TOUCHSCREEN WHICH WORKS BRILLIANTLY IN THE FIELD."

Phase One continues to expand its lens system and among the recent additions is a highly-desirable Schneider Kreuznach 35mm f3.5 leaf-shutter wide-angle (equivalent to 21mm with the 60 MP and 80 MP sensor backs).

combination is no more demanding to use than any pro-level full-35mm D-SLR and, although philosophically quite different, comparable to the Pentax 645Z.

We tried the XF with both the IQ3 60 and IQ3 50 backs, but concentrated mostly on the latter given the spotlight on 50 MP capture across several formats at the moment. Perhaps the most ironic aspect of our test is that the XF can be successfully used hand-held in situations where the Canon EOS 5Ds can't because of sharpness issues – purely related to the pixel size and density – related to either internal vibrations or external camera shake. For once, a bigger and heavier camera has benefits. Less surprising, of course, is that bigger pixels have benefits too, and this is most evident in the exceptionally wide dynamic range – quoted at 14 stops – delivered by the CMOS-equipped IQ3 50. Smoother tonal gradations, crisper definition and a superior signal-to-noise ratio are the key enhancements to which can be added the various performance advantages of medium format lenses. For example, Phase One says its latest 'Blue Line' models – of which the 35mm LS is one – are good for capture resolutions of "beyond" 100 megapixels, but also aberrations such as diffraction are less of an issue. The CMOS-based IQ3 50 also delivers exceptional low-light performance all the way up to ISO 6400 which makes its longer exposure durations quite useable… and delivers an image quality that the users of smaller format camera systems can only dream about.

THE VERDICT

Not surprisingly, the XF in concert with any of the IQ3 capture backs is an expensive proposition, especially for photographers who aren't going to be putting their cameras to work. Selling the superior performance remains the key marketing challenge for all the makers of digital medium format cameras, but particularly those whose products wear the sort of price tags we're more accustomed to seeing on the windscreens of new cars.

The differences compared to, say, the 50 MP Canon D-SLRs might be easier to justify on a number of levels, but the Pentax 645Z is harder to argue around given it's using a similar size and type of sensor as the IQ3 50.

So we're not going to try to do it here beyond stating that the XF is actually much better built, offers the flexibility of interchangeable finders and is supported by a bigger system of dedicated lenses (many with leaf-shutters), but whether all this is worth the substantial extra investment is harder to determine outside the context of professional use.

In reality, money can't be the sole consideration here and it's more relevant to concentrate on what the XF offers… which is an extremely well-thought-out digital medium format platform that, beyond the benefits already listed in the previous paragraph, delivers exceptional levels of convenience, efficiency and functionality. With the XF, Phase One now has a camera body that's able to match what it has been offering with its IQ Series capture backs and Capture One image processing software for some time – intelligently designed products that maximise efficiency and optimise performance. If photography is your livelihood, that's an investment well worth making. If technical perfection is your goal… well, it's certainly worth considering.

BUT WAIT, THERE'S MORE...

100 MEGAPIXELS CAPTURE IS HERE

If 50 megapixels and around $53,000 isn't quite enough for you, then how about 100 MP of resolution and a price tag of just under $65,000? Phase One is the first to hit the magic 100 megapixels market with a new IQ3 series capture back which delivers 101 MP. The image size is 11,608x8708 pixels which translates into a massive output size of 73.2x96.3 centimetres at 300 dpi. The dynamic range is an impressive 15 stops.

What's more, this 100 MP sensor is a CMOS device – a co-development between Phase One and Sony – and has a sensitivity range equivalent to ISO 50 to 12,800. Colour is processed at 16-bits per RGB channel to deliver a wider colour gamut and, quite simply, truly stunning image quality. If you want the ultimate in digital image capture performance, here it is! A complete camera kit will set you back $64,900 while the IQ3 100MP back on its own is a mere $55,000 (and it can be fitted to other digital medium format SLR bodies).

VITAL STATISTICS

PHASE ONE XF + PHASE ONE IQ3 50 $52,470

Type: Professional digital medium format SLR with Mamiya 645AF bayonet lens mount.
Focusing: TTL automatic via phase-detection type using one megapixel CMOS 'Honeybee' sensor array. 'Floating Point Architecture' processing with Spot, Average and Hyperfocal modes. Manual switching between one-shot and continuous modes, full-time manual override using focusing collar on lenses, low light/contrast assist via built-in 'Precision White Light' illuminator. AF micro-adjustment for up to 32 lenses.
Metering: TTL using one megapixel CMOS sensor with matrix, average and spot measurements plus TTL flash metering.
Exposure Modes: Program, shutter-priority auto, aperture-priority auto, metered manual, and TTL auto flash. Exposure compensation up to +/-5.0 EV in 1/3, 1/2 or in full stop increments.
Shutter: Electronic, focal plane type, 60 minutes to 1/4000 second plus B. Flash sync up to 1/125 second. Schneider LS lenses have built-in leaf shutter with flash sync up to 1/1600 second.
Viewfinder: Interchangeable; 90 degree prism finder is standard. Coverage = 97% vertical/horizontal. Interchangeable focusing screens (choice of three). Standard screen has AF and spot metering area marks. Eyepiece strength adjustment built-in. Optional waist-level finder available.
Flash: External units sync via ISO-standard hotshoe on prism finder or PC terminal. Integrated Profoto 'Air' RF transmitter for wireless remote triggering of Profoto studio flash equipment.
Additional Features: Mirror lock-up with adjustable vibration delay setting (0.5-8.0 seconds), AE lock, depth-of-field preview, 4.0 cm LCD camera control panel with touchscreen functionality and customisable display, dual shutter releases, auto exposure bracketing (two to five frames), adjustable setting limits (apertures, shutter speeds and ISO), customisable controls, remote control terminal, audible signals (switchable), variable stand-by time-out, 80 custom settings.

DIGITAL SECTION – Phase One IQ3 50
Sensor: 51.4 million pixels, full-frame CMOS with 33.1x44.2 mm imaging area. Sensitivity is equivalent to ISO 100-6400.
Focal Length Increase: 1.3x with 6x4.5cm format lenses.
Formats/Resolution: RAW with lossless compression on IIQ RAW files, two levels (typical file sizes are 50 MB and 33 MB). 8280x6208 pixels, 48-bit RGB colour.
Recording Media: CompactFlash memory card with UDMA-7 support.
Continuous Shooting: 1.8 frames per second.
White Balance: Auto correction, four presets (daylight, fluorescent, tungsten and flash), custom measurement.
Interfaces: FireWire 800, USB 3.0, WiFi (802.11n).
Additional Digital Features: Wireless remote control via Capture Pilot app, 1.0 GB of high-speed buffer memory, 8.1 cm LCD TFT monitor screen (1.15 megadots), touch screen controls (menus, browse, zoom, etc), 'Virtual Horizon' display, histogram display, focus mask function (for checking depth-of-field and focus), superimposed grids (choice of six, also adjustable for colour and line style), USB 3.0 connection, FireWire 800 interface for tethered operations, automatic rotation for horizontal and vertical framing, built-in WiFi. The compatible shutter speed range is 60 minutes to 1/10,000 second. Dynamic range is 14 f-stops.
Power: 3400 mAh 7.2 volt lithium-ion battery pack. 'Powershare' facility available when IQ3 Series backs are fitted.
Dimensions (WxHxD): 152x135x160 mm (camera body with prism finder).
Weight: 1390 grams (camera body with prism finder).
Price: $52,470 (inc. GST) for complete XF camera with IQ3 50 capture back, 90-degree prism viewfinder and Schneider Kreuznach 80mm f2.8 AF LS standard lens. Camera kit also includes four battery packs, 16 GB CompactFlash memory card and card reader. The XF IQ3 system is supported with a five year warranty
Distributor: L&P Digital Photographic Pty Ltd, telephone (02) 9906 2733, or visit www.lapfoto.com.au

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SANDS IN TIME

The Picture

The Te Paki sand hills, are situated near the top of the North Island of New Zealand, not far from Cape Reinga. This is the largest publically accessible expanse of sand in the nation. Every location needs conditions that offer the best conditions for camera work and, in this case, threatening clouds and bursts of sun light produced the right combination.

The Photographer

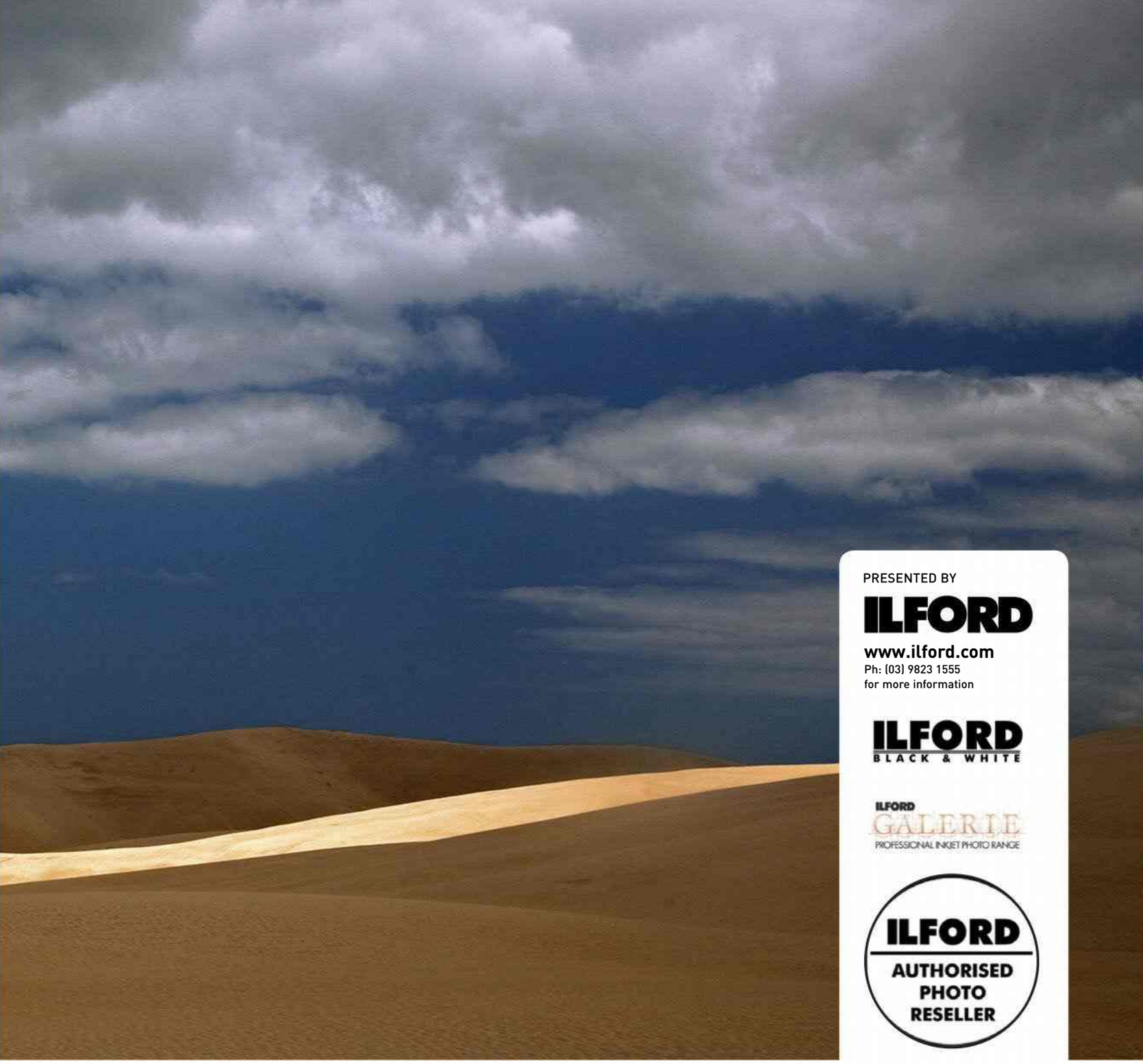
As well as being this magazine's digital printing expert, Trevern Dawes is an accomplished photographer and writer. His many ventures into publishing have included a photographer's guide to the many beautiful locations in New Zealand which remains a happy hunting ground for his camera.

The Equipment

Canon EOS 5D Mark II fitted with a 24-105mm 'general purpose' zoom lens. A small backpack suitable for a few hours of photography with a bottle of water and a poncho to cover both photographer and pack just in case of rain. ISO at 200, aperture priority at f11, no need and no time for tripods.

The Technique

When it comes to sand dunes by the sea or in the desert, it's important to protect your camera equipment. Wind-blown sand particles can cause problems to both camera gear and your eyes. Wear sun glasses by all means. On this occasion, fortunately the weather was calm in the Te Paki sand hills.



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How It Was Done

When such favourable conditions are encountered, the very first requirement is to get on location and try to find the best vantage points. As the structure of sand hills is forever changing, any previous recollections of a big sand hill don't count as it's hardly likely to still be there. You feel you'd like to be everywhere at once, and there is that urgency to make the most of the circumstances before the sun is blocked out completely or the clouds disperse. Luck plays an important role but, as with many endeavours, luck is what you make it.

Tricks Of The Trade

Patience and perseverance are the key requirements when the light is changing rapidly. See something or predict something and the reaction time often needs to be as quick as a sporting highlight or a journalistic event. Framing must be prompt and instinctive and, if there's only a brief period of spot lighting, more than just one shot may be required. Sometimes the potential lies in broad scenes and sometimes in close detail so it's a matter of being on the lookout for all possibilities.

Degree Of Difficulty (Out of 10)

Difficulty can vary enormously, depending on conditions. Spot lighting in landscapes can be a huge challenge where seeing and shooting must be a fast and fluid process. In this case an unusual minimal landscape with good shape and colour have come together nicely and the result is surely worth at least a '9'.

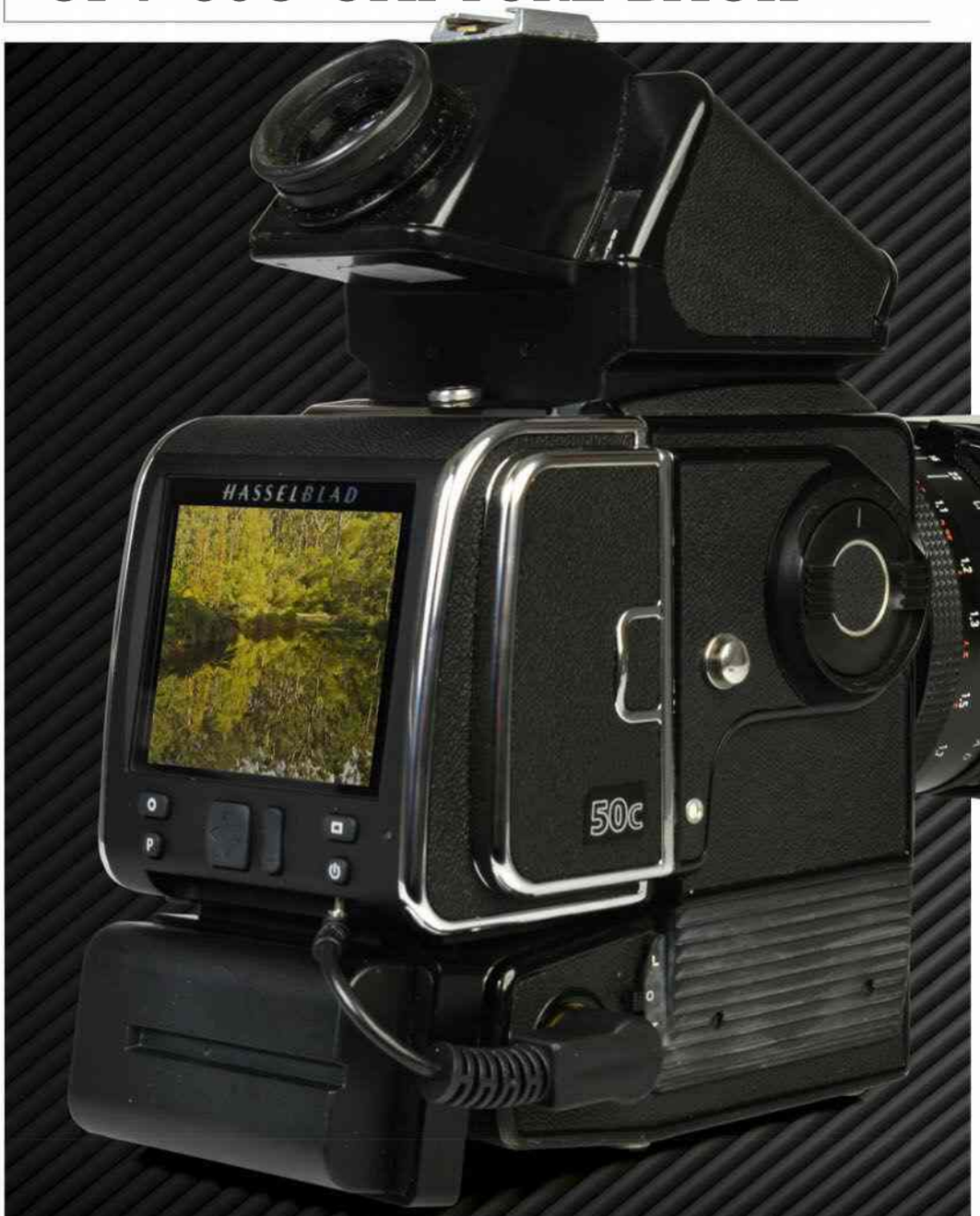
Can You Try This At Home?

You may not have sand hills right on your doorstep, but success in landscape is all about being in the right place at the right time. So find a favourite location and keep going back to discover when all the key elements come together to create a dramatic photograph. Watch out for the seasonal variations and, of course, don't be afraid of a bit of bad weather (because it often means great looking skies)… or, for that matter, blowing sand.

Photograph by Trevern Dawes, copyright 2016.

HASSELBLAD
CFV 50C CAPTURE BACK

REPORT BY PAUL BURROWS



Hasselblad 500EL/M with the CFV 50c capture back fitted. Exposure Cable EL is only needed for remotely controlling a tethered motorised camera using Hasselblad's Phocus software. It's not required for the 'digital ready' 555ELD.

BACK TO FRONT

Is this the most economical route into digital medium format photography? Just add any classic 500 Series Hasselblad body to the CFV 50c capture back and you're ready to go.

You may not know this, but digital photography began with interchangeable capture devices – better known simply as backs – fitted to existing medium format SLR bodies. Those first backs were actually scanners which made for very long exposures and demanded static subjects, but we quickly moved onto area array sensors and the rest, as they say, is history.

But you may not know this either – you can still take this route into digital medium format photography, fitting a contemporary capture back to a film-era camera body. This body has to, of course, allow for the interchanging of film magazines so they can be replaced by the capture back, but there are still Bronicas, Mamiyas, the Contax 645AF, Fujifilm's GX680 models and a myriad of classic Hasselblads that can be converted to digital capture. Ironically, it's Hasselblad that's pursued a 'closed loop' policy with its H System, but most current Phase One and Mamiya

Leaf backs can be fitted to the majority of 120/220 rollfilm SLRs (excluding some of the oldest models) via the appropriate adaptor plate and, in some cases, a sync cable.

But don't worry, Hasselblad makes a product specifically for this application and, what's more, it's styled to look exactly like one of its classic rollfilm magazines. Incidentally, there's now also a contemporary Hasselblad camera body – the H5X – which can be fitted with film magazines or, indeed, the capture backs from other manufacturers, but that's another story. These days, Hasselblad differentiates between its H System which is based on the original 6x4.5cm format H1 (launched back in 2002) and V System which encompasses all the 500, 200 and 2000 series 6x6cm format cameras, dating back to the pioneering 500C from 1957.

Hasselblad's CFV capture backs are specifically designed for the V System bodies, but the earlier models have all be equipped with CCD-type sensors, including the CFV 50. However, the CFV 50c model has a 50 megapixels CMOS sensor similar to the device that's also on offer from Phase One, Pentax, Leica Mamiya Leaf, as well as being used in Hasselblad's own H5D-50c digital camera system.

THE CLASSIC 500 SERIES SLR BODIES ARE PRETTY AFFORDABLE THESE DAYS SO EVEN FACTORING IN BUYING A COUPLE OF LENSES, THE SUB-$15K CFV 50C IS COMPARATIVELY AFFORDABLE ROUTE IN DIGITAL MEDIUM FORMAT PHOTOGRAPHY.

This means all the advantages of a big CMOS sensor can be applied to one of Hasselblad's classic 6x6cm SLRs.

OK, so in reality, you probably wouldn't press an original 500C back into service as a digital camera, but a 1970s-build 500C/M may well still have plenty of life left in it, and this is certainly the case with the later 503 and 501 models, likewise the EL/M and ELX motordriven bodies. All are fully mechanical and can be fitted with metering prisms, but the 503 Series have TTL-OTF flash metering built into the camera bodies as do the motorised 500ELX, 503ELX, 553ELX and the last-of-the-line 555ELD. As all these cameras rely on leaf-type shutters in the lenses, flash sync is at all shutter speeds. If you like the idea of using an EL 'Blad, make sure that any 500EL/M or 500ELX you look at has been converted to use standard AA-size batteries (they originally used proprietary NiCd cells made by Varta and now impossible to find).

The 2000 series cameras have focal plane shutters, but were never equipped with metering of any sort. This came with the later 200 series (starting with the 205TCC in 1991), but these cameras weren't built in big numbers so they're harder to locate second-hand than the much more numerous 500 series models, but all have built-in TTL metering and aperture-priority auto exposure control (except for the entry-level 201F).

You can also use the CFV 50c on the SWC superwide (i.e. fixed lens) cameras from the original model to the last of the line 905, although there may be some optical performance issues with the older lenses which lack the later Zeiss T* multi-coating.

The good news is that pre-loved 500 series SLR bodies are pretty affordable (and plentiful) these days so, even factoring in buying a couple of lenses, the sub-$15k CFV 50c is a comparatively affordable route in digital medium format photography or, more specifically, *Hasselblad* digital medium format photography. This is even more the case if you're reviving a film camera kit that's been sitting idle on a shelf for a while.

CLASSICAL GOOD LOOKS

As with the previous CFV capture backs, the 50c is styled to look exactly like a 6x6cm film magazine complete with chromed bright-work and leatherette inserts. It matches all the detailing on the camera bodies so only the 7.62 cm monitor screen and buttons on the back panel are the give-away. The compartment cover for the memory card slot is particularly cleverly done, and its shaping ex-actly matches the curve of the film magazines.

In many circumstances the operation is cordless (i.e. a sync cable isn't needed), a first for V System bodies and made possible by utilising the same mechanical tab linkage used in the film magazines. In the film backs it served to detect whether the darkslide had been removed; locking the shutter if it hadn't. On the CFV 50c it essentially 'wakes up' the digital back in readiness for an exposure to be made. This applies to all the 'analog' 500 series models from the 500C to the 553ELX. If you want to go further and control the camera remotely (i.e. from a computer in a tethered situation) via Hasselblad's Phocus software, then the supplied Exposure Cable EL is required for the EL/M and ELX motorised cameras; or the Exposure Cable 503CW for, logically, the 503CW when it's fitted with the Winder CW.

Obviously, the non-motor 500 cameras can't be remotely controlled from Phocus, and the 2000/200 models all require a flash input cable to sync the shutter release with the digital back. However, the 200 Series models can be modified to allow cable-free operation. In other words, one way or another, the CFV 50c allows the convenience of cable-free operation with pretty well any V System camera body.

Power comes from camcorder-style battery pack which clips to the back's base. However, the EL cameras all have a rear extension from their own battery compartments which prevents this happening, so these models require an optional L-shaped adapter plate. This moves the battery connection bay through a little over 90 degrees into a near-vertical orientation so the pack is now located just behind the camera body's extension, but still largely positioned under the capture back. This adaptor is also required when using the CFV back on the SWC cameras.

While it adds a bit more visual bulk, it doesn't have any adverse effect on the handling or operations such as getting the camera on or off a tripod head.

GETTING STARTED

There is a small, but critical set-up requirement which involves making a setting in the back's menu for the particular type of camera in use – i.e. 'ELD', 'ELX', '500' or '200' – primarily because the shutter sequencing varies from model to model. Without the correct camera type setting selected, the back and body simply won't talk to each other. By default, the back is set to a slowest exposure time of 1/8 second so, if you know that you're going to be shooting with longer exposures, a new limit needs to be preset in the menu. With exposure times longer than 1/8 second, you encounter one of the limitations of cable-free shooting, namely that the sensor is being exposed to light both before and after the actual exposure which can cause colour shifts and other problems. A hit-and-miss solution is to increase the exposure time by between ten to 20 percent, but a better solution for anybody regularly using longer exposure times is to switch to using the sync cable which precisely controls when the sensor is active (but the camera setting then has to be changed to 'Flash Sync'). Nevertheless, beyond this, set-up is very straightforward and many users probably won't have to worry about the camera type setting ever again.

Subsequently, it's a case of navigating the Settings menu to configure all the usual items such as the display options, audible signals, date and time, and power management. The CFV 50c's menus are reasonably logically arranged and easy to navigate via a four-way keypad, although why the all-important Menu/Exit button is simply marked "o" is a bit of a mystery. Once you've selected a function, a plus/minus rocker switch is used to cycle through the options. The 7.62 cm monitor screen takes up most of the back's rear panel, and while the resolution isn't quoted in the specs, it's reasonable to assume it's the same 460,320 dots TFT LCD panel as is used on the H5D-50c camera.

LENSES AND VIEWFINDING

The sensor delivers a maximum resolution of 8272x6200 pixels (i.e. 51.2 megapixels) and has an imaging area of 32.9x43.8 mm which represents a focal length magnification factor of 1.45x with 6x6cm format lenses.

The widest-angle lens available for the V System is the Zeiss Distagon CF 30mm f3.5 – fiercesomely expensive in its day, and still not cheap now – which becomes a 43.5mm or, then translated into 35mm terms, close to a 24 mm. Not really ultra-wide anymore, but certainly OK for landscapes, for example. First though, find your 30mm Distagon so, more likely than not, you'll end up with the 40mm f4.0 which is a little more affordable, especially the older versions. It effectively becomes a 58mm – equivalent to around 32 mm in 35mm format terms – so going down the CFV 50c route does

The EL motorised cameras require the use of an optional battery adapter plate to clear the camera's own battery compartment housing.

Memory card compartment is concealed behind a panel which replicates a detail on the film magazines. The back accepts CompactFlash memory cards and supports UDMA high-speed data transfer.

The styling of the CFV 50c exactly mimics that of the classic Hasselblad film magazines complete with chromed brightwork and leather-look inserts.

SIGMA

Breakthrough in Full-Frame

It's the world's first full-frame zoom lens with a wide-open, constant aperture of F2 throughout the zoom range. A fast, razor sharp wide-angle and a standard lens in one. You get a 24 to 35mm zoom with the same sharpness and resolution as a fixed focal length lens. Fast and silent 'hyper sonic' auto focus captures every image, incredibly sharply, in an instant. It's rugged, ergonomic, beautifully constructed from Thermally Stable Composite. It has the feel of an exceptional quality lens. Because it is.

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THE LEVEL OF DETAILING MAINTAINED AT THE HIGHER ISOs IS ANOTHER BENEFIT OF THE BIGGER SENSOR VERSUS, SAY, A D-SLR WITH A FULL-35MM FORMAT IMAGER.

mean some limitations on wide-angle lens capabilities. This is also true when using it on the SWC cameras with their fixed Zeiss Biogon 38mm f4.5 lenses. And the prospect of any new wider-angle V System lenses from Hasselblad (or, indeed, anybody else) is approximately zero. While we're here, another issue is that the sensor isn't square (and it doesn't rotate) so you can either select this aspect ratio in the Custom Options menu, thereby introducing another cropping factor, or live with mostly shooting in the horizontal orientation… classic Hasselblads having never been designed with vertical handling in mind. It's easier to use one of these cameras in the vertical if it's mounted on a tripod, and this is where the live view function really comes into its own as you can by-pass the viewfinder and use the monitor screen instead. However, when using the finder, the back is supplied with a dedicated Acutematt split-image focusing screen which has masking for the full sensor area and the cropped square image. Live view wasn't initially available as a standalone feature, but all CFV 50c backs shipping now have the necessary firmware upgrade.

Hasselblad's 'Instant Approval Architecture' system provides both visual and audible confirmation of good exposures. Alternatively, the preview options include the option of separate RGB histograms or a combined RGB graphic or, thirdly, a brightness histogram over which are laid the RGB channel traces. There's also the choice of a full screen preview or a standard preview which includes the file number, basic capture information (i.e. ISO and WB) and a number of indicator tiles – relating to the control panel – for performing subsequent actions. Browsing is via the navigator keypad and there's a zooming function with an insert view providing a position reference, a nine-image thumbnail screen or a folder view.

With its big 5.3 micron pixels, the CMOS delivers an extended sensitivity range equivalent to ISO 100 to 6400, and a massive 14.5 stops of dynamic range. The maximum exposure duration is 12 minutes and the continuous shooting speed is 1.5 fps, but obviously only single-shot capture is possible with the non-motorised camera bodies. The CFV 50c captures 16-bit RAW files in the Hasselblad 3FR format with the option of appending one-quarter resolution (i.e. 12.5 megapixels) JPEGs. This is another consideration for anybody contemplating a move up to digital medium format photography – RAW capture is mostly the norm and these files need to be processed post-camera which demands time and a big increase in your storage capacity.

PERFORMANCE

We tested the CFV 50c on a 1982-vintage 500EL/M which obviously required fitting the battery adapter plate. After a little toing-and-froing with creating the camera type setting, we were off and running with no further problems. It's as simple as switching on the back, selecting the desired ISO and white balance (there's a choice of presets or manual colour temperature settings from 2000 to 10,000 degrees Kelvin), and then setting the apertures and shutter speeds on the lens. You can use the back as an exposure 'meter', determining exposures by trial and error, but it's probably much quicker to simply use a hand-held meter (assuming the camera isn't fitted with a metering prism).

Returning briefly to the discussion of lenses, various corrections for most Zeiss CF, CFE, CFi, F and FE lenses are available in Phocus which overcomes some of their film-era performance characteristics and deficiencies. These comprise distortion, lateral chromatic aberrations and vignetting. Phocus also has moiré pattern removal and Hasselblad's one-size-fits-all 'Natural Colour Selection' profile (which analyses image content) to determine the most suitable reproduction and correction. You can use Adobe Lightroom for processing the 3FR RAW files, but the all-important DAC lens corrections aren't supported. We've now experienced this 50 MP CMOS sensor in various capture devices including the Pentax 645Z and Phase One IQ3 50, but each obviously uses different processors to manage digitisation and noise reduction (performed on-chip), and compression and colour management. This amount of resolution delivers lots of crisply-defined fine detailing, and the wide dynamic range – particularly impressive in terms of the shadows – once again proves the value of big sensors with big pixels.

The colour reproduction, once Phocus has done its stuff, is exceptional and surprisingly transparency-like, a quality that's perhaps partially down to the contrast and colour of vintage Zeiss optics. Noise levels are negligible up to ISO 1600 and still acceptably low at ISO 3200 and 6400, sensitivity 'speeds' you could never explore when a film magazine was attached to your 500 series SLR body. And while the CCD-equipped back struggled at ISO 800, even at ISO 6400 the 50c looks better. The level of detailing maintained at the higher ISOs is another benefit of the bigger sensor versus, say, a D-SLR with a full-35mm format imager.

Not surprisingly, there can be some lens performance issues – chromatic aberrations and colour shifts – which the DAC correction in Phocus deals with effectively. It's probably self-evident, but the Phocus software is very much part of the whole package as far as the CFV 50c is concerned.

THE VERDICT

Marrying mechanical cameras with their origins in the 1950s with the latest in 21st century digital capture technologies is never

The control panel is simplicity itself. All navigation and setting operations are performed via the combination of four-way keypad and plus/minus rocker (seen at centre). The menu system is easy to navigate. Note the default setting for the maximum exposure duration.

Preview options comprise (from top) an image overlaid with RGB histograms, an image with a full set of histograms (brightness shown by the grey background graph), or a set of RGB histograms accompanied by basic capture details.

Zooming function assisted by an inset image with a reference target.

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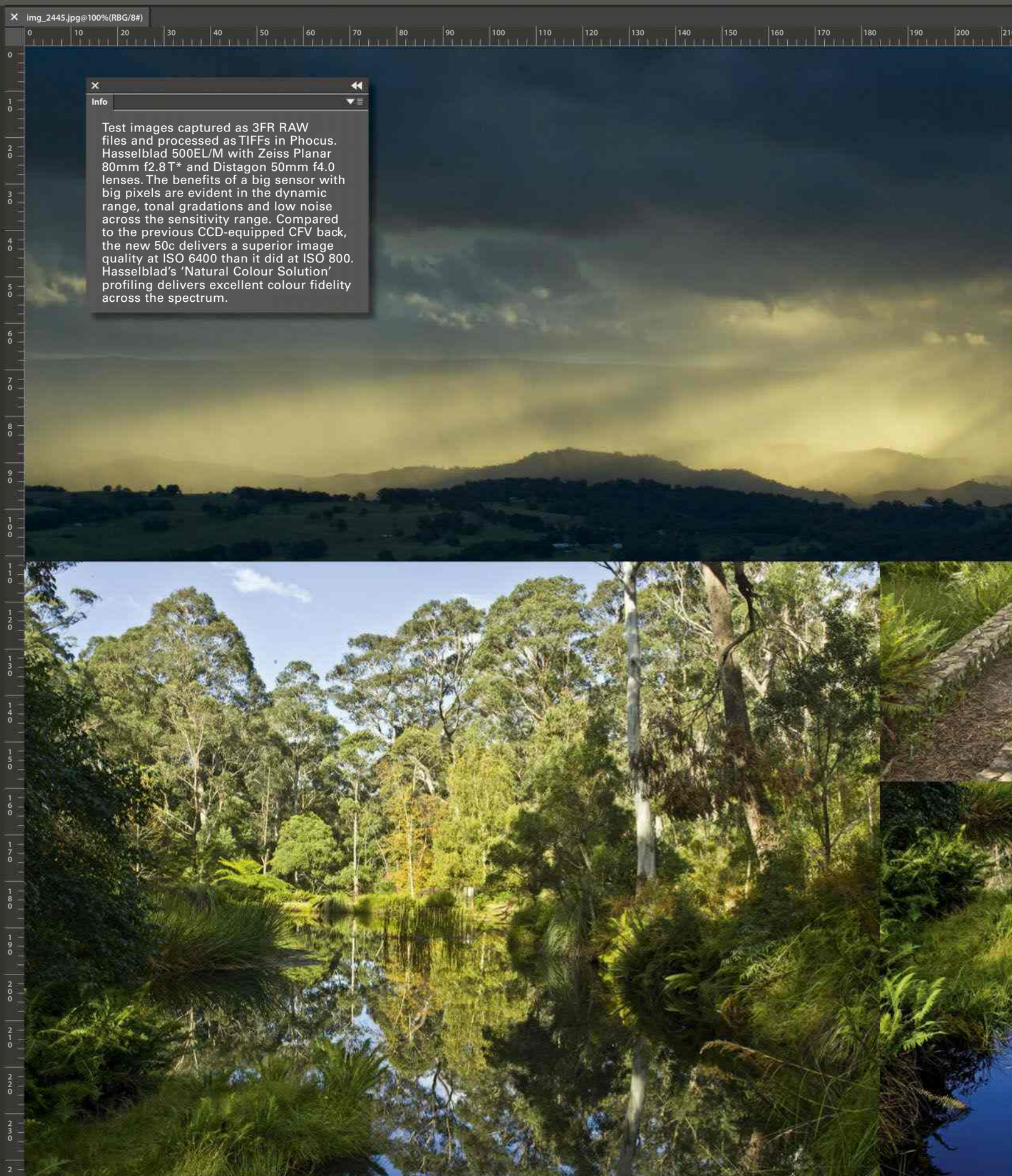
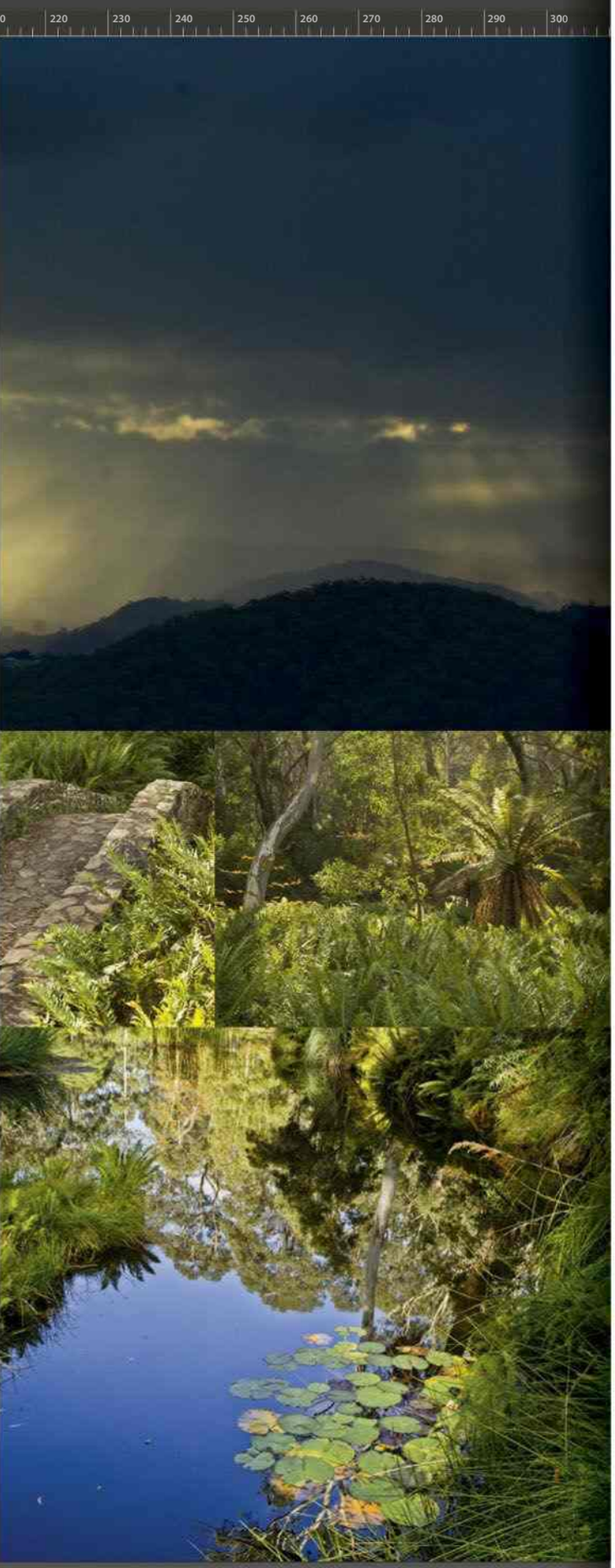

img_2445.jpg@100%(RBG/8#)
Info
Test images captured as 3FR RAW files and processed as TIFFs in Phocus. Hasselblad 500EL/M with Zeiss Planar 80mm f2.8 T* and Distagon 50mm f4.0 lenses. The benefits of a big sensor with big pixels are evident in the dynamic range, tonal gradations and low noise across the sensitivity range. Compared to the previous CCD-equipped CFV back, the new 50c delivers a superior image quality at ISO 6400 than it did at ISO 800. Hasselblad's 'Natural Colour Solution' profiling delivers excellent colour fidelity across the spectrum.
100%
Doc: 2.8mb



> THE 500 SERIES HASSELBLADS WERE HUGELY POPULAR FOR LOTS OF GOOD REASONS, SO THE IDEA OF REVIVING THEM AS A WORKABLE DIGITAL CAMERA IS NOT ONLY FEASIBLE, BUT VERY ATTRACTIVE.

going to be without compromises, but in practice Hasselblad has done a very good job of minimising them.

The CFV 50c is a truly cable-free solution on the 500 series bodies which probably represent the majority of host cameras given their popularity in the day and plentiful supply now. Consequently, for many potential buyers, the in-the-field experience actually isn't all that different to shooting with rollfilm. Certainly the handling and basic camera operations are unchanged and, of course, the visual integration of the old and the new is very well done.

The smaller (than 6x6cm) sensor size and its aspect ratio aren't issues unique to Hasselblad and are the same if you choose to fit the Phase One or Mamiya Leaf 50 MP CMOS-equipped backs to a V System camera body. The simplest solution in many cases will be to shoot in the landscape format and then crop the image later on as required given there's plenty of 'room to move' in terms of the resolution. It's also worth noting that, compared to the Phase One and Mamiya Leaf products, the Hasselblad back is hugely affordable, even more so if you already have the bodies and lenses. The Pentax 645Z is more affordable again (and, it has to be said, much more capable), but start adding up the purchasing of a couple of lenses and the difference actually isn't all that great in the end.

The 500 series 'Blads were hugely popular for lots of good reasons, many of which still apply today, so the idea of reviving them as a workable digital camera is not only feasible, but very attractive. Thus, the great joy of the CFV 50c is being able to use the likes of the 500C/M and 500EL/M again and re-acquaint yourself with just how *right* these cameras still feel. Despite how much camera tech has arrived since, the classic Hasselblads provide a degree of comfort and convenience that belie their fully manual operation… no wonder they remained in production, in one form or another, for 56 years. There's a lesson in there somewhere.

VITAL STATISTICS

HASSELBLAD CFV 50C $14,999 capture back only

Type: Fully portable digital camera back for one-shot RGB capture.
Supported Cameras: Hasselblad V System (i.e. most 500-series models since 1957). The 2000 and 200-series models with some limitations. View and wide-angle cameras via V System adaptor plate.
Sensor Type/Size: CMOS, 32.9x43.8 mm.
Number of Pixels: 50 million (6200x8272 pixels).
Focal Length Conversion Factor: 1.45x with 6x6cm format lenses.
A/D Conversion: 16-bit per RGB colour.
Storage Medium: CompactFlash memory cards with UDMA speed support.
Data Compression: Lossless on Hasselblad 3F RAW files. Typical file size is 65 MB. JPEG compression on 12.5 megapixels 'print ready' files.
Sensitivity Range: ISO 100 - 6400.
Shooting Speed: 1.5 frames per second.
White Balance: Presets for Daylight, Cloudy, Shade, Flash, Fluorescent and Tungsten. Manual colour temperature setting from 2000 to 10,000 degrees Kelvin. Custom setting via grey card.
Power Source: Rechargeable 8.4 volts lithium-ion battery.
Features: Styled to replicate the look of a classic V System film magazine, cable-free connection, 7.62 cm TFT LCD monitor (460,320 dots), live view, real-time histogram, overexposure indicator, 'Hasselblad Natural Colour' generic profile, 'Instant Approval Architecture' visual and audible feedback indicators, FireWire 800 connection, long exposures up to 12 minutes, digital lens correction for Zeiss lenses (distortion, lateral chromatic aberrations and vignetting) in supplied Phocus software, 14 stops of dynamic range.
Dimensions (WxHxD): 91x92x57 mm
Weight: 530 grams (excluding battery pack and memory card).
Price: $14,990 which includes Phocus software, dedicated focusing screen and Exposure Cable EL. L-shaped battery adapter plate costs $440.
Distributor: C.R. Kennedy & Company Pty Ltd, telephone (03) 9823 1555, or please visit www.hasselblad.com.au

PENTAX
PENTAX 645Z

REPORT BY PAUL BURROWS

Pentax's medium format D-SLR has a '645' format CMOS sensor which delivers conveniences such as live view and a number of performance benefits, including Full HD video recording.

MEDIUM WELL DONE

Nearly two years down the track, the Pentax 645Z is still the most affordable route into digital medium format photography… and it also remains the best-featured '645' D-SLR on the market.

When we first road-tested the Pentax 645Z we suggested that the ultra-high resolution full-35mm format D-SLRs were making the extra investment in the bigger sensor camera harder to justify. Time suggests that the more relevant comparison is with the alternative digital medium format systems that are also built around a 50 megapixels '645' format CMOS sensor. For starters, nobody gets close to the Pentax's price tag – now a little over $10,000 for the camera body – and nothing released since can match it for features or specifications which are closer to those of a high-end smaller format D-SLR than anything else. What's also working in the 645Z's favour is that the price gap to the full-35mm D-SLRs with 50 MP

on tap isn't all that great, especially when the performance benefits of having bigger pixels are taken into account (something that's helping validate digital medium format cameras across the board… even the really pricy ones). Additionally, Ricoh – custodian of the Pentax brand these days – has been working overtime to expand its system of digital-era lenses for the 645Z, the one area where both Phase One and Hasselblad have had a definite advantage. The original 645D – predecessor to the 645Z – essentially launched with just one dedicated lens (sound familiar?), but now there's not only a wider selection of models specifically for the 645D/Z, but also the once hard-to-get 645N lenses – mostly only available in Japan – are distributed globally. This has created a system of 17 lenses spanning 28mm to 400mm (equivalent to 22mm to 315mm) and including six zooms and a true macro. The newer digital-era DFA-series features such as the SDM built-in focusing motors, weather-proofing and image stabilisation.

Traditionally, even in the days of 120/220 rollfilm, medium format cameras were quite utilitarian in their specifications, the emphasis being on functionality rather than frills. This continues into the digital era and the key control systems – i.e. for focusing and exposure – can still be surprisingly rudimentary. Pentax actually took a different course with its 6x4.5cm film 645 – launched in 1984 – which introduced a hitherto unprecedented level of automation to the sector; something that's continued with the 645D and is even more the case with the 645Z which remains not only the best-featured digital medium format camera on the market – by a significant margin – but its systems and features are comparable with the current higher-end 'APS-C' and full-35mm format D-SLRs. It's still more expensive than anything in these smaller classes, but if the pursuit of absolute image quality is your primary goal then having a sensor that's 1.7x times larger than a full-35mm imager – and in the order of 2.5x larger than 'APS-C' – makes the price difference easier to justify.

Like Hasselblad, Leica and Phase One, Ricoh has adopted a CMOS-type sensor for the 645Z because it delivers a number of performance benefits, among other things, faster continuous shooting speeds (although this is still relative, compared to the smaller formats), live view and Full HD video recording… all of which help make digital medium format a more attractive proposition for the non-professional user.

The 645Z further builds on the CMOS-derived performance enhancements by inheriting most of the advanced control systems and features from the Pentax K-3 II, Ricoh's current 'APS-C' D-SLR flagship. It's a luxury no other maker of digital medium format camera systems has, and it turns the 645Z into a truly formidable machine.

PIXEL POWER

The Pentax's '645' format CMOS is essentially the same device that Hasselblad uses in its H5D-50c camera and CFV-50c capture back, and Phase One employs in its IQ1 50, IQ2 50 and IQ3 50 backs. It has an imaging area of 43.8x32.8 mm and a total pixel count of 53 million. The effective pixel count is still a massive 51.4 MP which delivers a maximum image size of 8256x6192 pixels. More importantly, the pixel size is 5.3 microns which helps contribute to a dynamic range of 14 stops and a native sensitivity range equivalent to ISO 100 all the way to 204,800… and that maximum is achieved without any expansion processing which is significant. Furthermore, Ricoh makes sure every drop of resolution is squeezed out of this sensor by not using a low-pass filter. Instead, the Pentax 645Z has the same 'AA Filter Simulator' system that was introduced in the K-3 and is also used in the K-3 II.

The 'AA Filter Simulator' system is essentially a mechanical solution using sensor shifting, but working in the reverse to image stabilisation. Instead, the sensor is shifted very fractionally in order to introduce the slight blurring

LCD monitor screen has tilt adjustments. The 8.1 cm panel has a resolution of 1.037 megadots.

NOTHING IN THE DIGITAL MEDIUM FORMAT WORLD GETS CLOSE TO THE PENTAX'S PRICE TAG AND NOTHING RELEASED SINCE CAN MATCH IT FOR FEATURES OR SPECIFICATIONS.

Keplerian telescopic trapezoid prism type viewfinder helps keep the size down. The big view is epic.

Monitor-based info display can be set to one of 12 colour schemes.

Rear control layout is very similar to that of a high-end 'APS-C' or full-35mm D-SLR.

or 'filtering' needed to counter moiré patterns. There are three settings – 'Off' which is obviously for prioritising resolution; 'Type 1' which is designed to balance resolution and moiré correction by shifting the sensor in a linear direction; and 'Type 2' which oscillates the sensor in a circular motion in order to optimise the blurring effect and, as a result, moiré correction.

The 645Z's image capture options comprise JPEGs in four sizes and three compression levels, 14-bit RGB RAW files recorded in either the Adobe DNG or PEF formats, and TIFFs. RAW+JPEG capture can be configured for any JPEG size and quality setting. The sensor is mated with Pentax's 'PRIME III' high-speed processor which enables Full HD video and continuous shooting at up to 3.0 fps. This may not seem very fast compared to the latest D-SLRs and mirrorless cameras, but it's not so bad in digital medium format terms and it's worth remembering that even the JPEGs are around 25 to 30 MB in size depending on the image content. The burst lengths are quite respectable – 30 frames with JPEG/large/best capture and ten in RAW mode.

The 645Z has dual SD memory card slots which support both HC and XC types as well as UHS-I speed data transfer plus Eye-Fi and FLU cards for wireless data transmission. The two slots can be set up in a variety of ways, including simultaneous saving to both (which creates a back-up) or the separate saving of RAW files and JPEGs. It's also possible to copy images from one card to another.

As just noted, the 645Z can also record video and it uses close to the whole sensor for this (a small outer area is reserved for image shifting with electronic image stabilisation) so the depth-of-field can be even shallower than it is with the full-35mm or 'APS-C' format.

THE BEST QUALITY JPEGS EXHIBIT A LEVEL OF DETAILING THAT'S TRULY DRAMATIC AND EVERYTHING STAYS CRISPLY RESOLVED EVEN WITH VERY BIG ENLARGEMENTS (JUST LIKE MEDIUM FORMAT FILM).

BIG VIEWS

Another major benefit of a CMOS sensor is live view which is now taken for granted with the smaller formats, but is comparatively new in the digital medium format world. The 645Z makes the most of this facility by having an LCD monitor screen that's adjustable for tilt, either up or down. Additionally, it's a large 8.1 cm, 3:2 aspect ratio TFT LCD panel with a resolution of 1.037 megadots, and also adjustable for brightness, colour balance and colour saturation.

The optical viewfinder employs a trapezoid-shaped pentaprism – because it's more compact than a conventional type – and provides a scene coverage of 98 percent. The standard 'Natural Bright Matte' focusing screen can be interchanged with one of four alternatives and it's an easy D-I-Y procedure. Even compared to a full-35mm D-SLR, the 645Z's viewfinder is truly huge and quickly addictive so that anything smaller starts to feel quite claustrophobic.

Externally, the 645Z looks quite imposing, but in terms of its overall bulk, it's actually not vastly different from either Nikon's D4S or Canon's EOS-1D X. The substantial handgrip is comfortable to hold, but this is definitely a two-handed camera even with one of the system's smaller lenses fitted. The control layout is based around a main mode dial with front and rear input wheels and various function buttons. On the handgrip side these are for sensitivity, exposure compensation and the AE lock while, on the opposite side of the pentaprism housing is a line-up of four buttons for the AF area modes, instant switching to

Time lapse recording is also available and at the 4K resolution of 3840x2160 pixels too (without sound obviously), but since Motion JPEG compression is used here, the resulting AVI files are huge.

Ricoh has always trod cautiously where video is concerned so it's perhaps not surprising that the 645Z doesn't have 'normal' continuous 4K shooting which would have made it really interesting…

as would an uncompressed video feed to its HDMI connector and aids such as a zebra pattern generator.

Consequently, the attractions of the bigger sensor aside, this is still primarily a stills camera.

RAW capture, setting up the auto exposure bracketing and locking the rear input wheel.

Most of the top deck is taken up with a huge monochrome read-out panel which is angled towards the user. There's a new – well, actually repurposed – selector for switching between still photography and video shooting plus, on the rear panel, a new button for either engaging live view or, in the video mode, starting and stopping recording.

The rear panel layout is actually quite similar to that of any smaller format D-SLR and is centred around a four-way keypad which is used for all navigational duties, including moving the focusing point. Each of the keys also have their own functions, providing direct access to the drive modes, white balance settings, flash modes and 'Custom Image' presets (more about these shortly). Pressing an adjacent button switches them between AF point duty and their other roles. A 'Status Screen' display in the main monitor shows all the main AF and AE settings and there's a 'Control Screen' which provides quick access to a range of capture-related functions. Another option here is a large dual-axis 'artificial horizon' level display (but less intrusive bar-type level displays are provided in live view).

TAKING CONTROL

The 645Z's bodyshell comprises magnesium alloy covers with a total of 76 seals at the various junctions and joints to protect against the intrusion of moisture or dust. Additionally, the body is insulated in key areas such as the battery compartment to enable operation to continue down to -10 degrees Celsius. Underneath is a diecast aluminium chassis and the lens mount is stainless steel.

The 645Z's control systems start with an 86,000 pixels RGB-sensitive metering sensor. In conjunction with the AF system, this delivers what Ricoh calls 'Real Time Scene Analysis' metering which is designed to determine most appropriate metering weighting for a given subject or scene (exactly like Nikon's 'Scene Recognition System'). There's the option of either centre-weighted average or spot measurements.

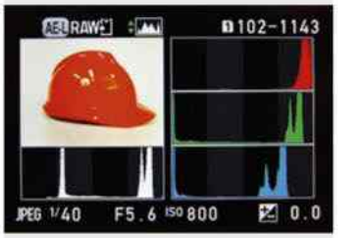
The menu design is the same as that used in Pentax's current 'APS-C' D-SLRs with self-contained pages within each chapter.

Sub-menus are accessed via a right click. Shown here are the program line options.

The Control Screen provides quick access to a range of functions in both the still and video modes.

The live view display components include a real-time histogram, dual-axis level indicators (top right corner), grid patterns and exposure level/compensation scale.

As on the smaller format Pentax D-SLRs, the standard choice of 'PASM' exposure control modes is supplemented with a couple of different methods of doing things. The first is Sensitivity-Priority AE – marked as 'Sv' on the mode dial – which allows for the ISO setting to be changed on-the-fly via the 645Z's rear input wheel and the exposure settings are then changed accordingly. The second is called Shutter & Aperture-Priority AE – marked 'TAv' on the mode dial – and it's essentially an auto ISO control in that the ISO setting is automatically changed in order to maintain a particular combination of aperture and shutter speed as light levels vary. The program exposure mode can be customised via a selection of six aperture/speed selection lines, namely Auto, Normal, High Speed Priority, Depth-Of-Field Priority – Deep, Depth-Of-Field Priority – Shallow and MTF Priority. These are all pretty self-explanatory, but the MTF Priority setting optimises the aperture selection to match the attached lens's MTF curve (as obtained from the lens's CPU). Program shift is possible in all settings and with either aperture or shutter speed priority, depending on whether the front or rear input wheel is used. There's also the option of 'Hyper' switching in both the program and manual modes. In program mode, turning the appropriate control wheel automatically switches the 645Z to either aperture-priority or shutter-priority auto operation… and the info display changes, for example, from 'P' to 'Hyper Av'. In manual mode, pressing the 'green-dot' button on the camera's back panel sets the exposure as it would be determined in the program mode and this can then be used as the starting point for fine-tuning.



The image review screens include (from top) brightness histogram, capture data or RGB histograms.

Further screen overlays for Parameter Adjustment and Moire Correction are also available.

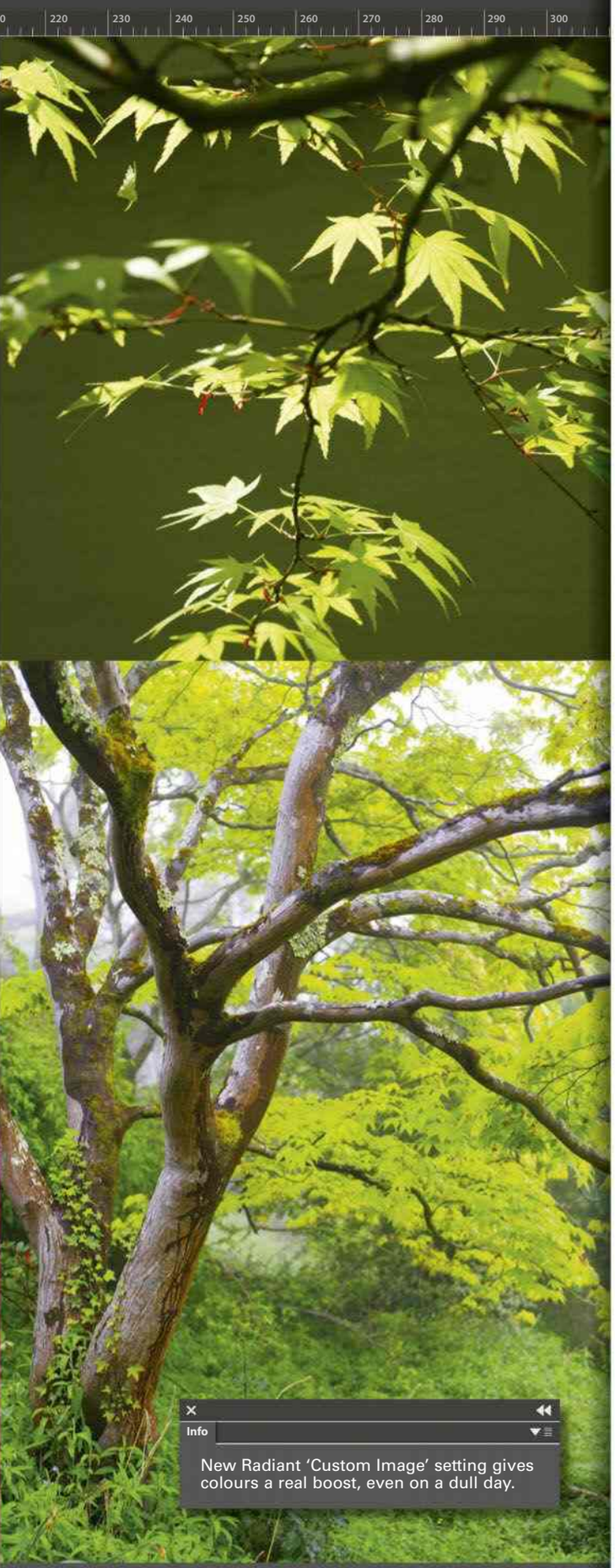
The auto and semi-auto exposure control modes are backed by an AE lock, compensation up to +/-5.0 EV and auto bracketing which can be set to operate over sequences of two, three or five frames with an adjustment of up to +/-2.0 EV per frame. The shutter has a speed range of 30-1/4000 second and it's tested to 100,000 cycles. Flash sync is at speeds up to 1/125 second, but the 645Z doesn't have a built-in flash. External flash units sync via either a hotshoe or a PC flash terminal.

SHARP SHOOTING

The autofocus system uses the 'SAFOX 11' module which has a total of 27 focusing points, 25 of them cross-type arrays arranged in a 5x5 pattern. Here, compared to its digital medium format rivals, Ricoh has the advantage of Pentax's long involvement in autofocusing so the 645Z has the most sophisticated AF system in this category by a significant margin.

The three focusing points in the very centre of the frame (arranged vertically) work with f2.8 speed lenses and the system's the sensitivity extends down to EV -3.0 (at ISO 100). Low light assist is provided by a built-in LED illuminator. Switching between single-shot and continuous operation is done manually and there's an extensive choice of AF area modes with auto point

img_2445.jpg@100%(RBG/8#)
Info
Test images captured as JPEG/large/best files with 55mm f2.8 SDM standard lens. Resolution is exceptional as is the dynamic range which is still good at ISO settings as high as ISO 3200 or 6400. Noise is negligible up to ISO 1600 and commendably low up to ISO 6400.
100%
Doc: 2.8mb



selection over one, nine or the full 27 points and manual point selection over one, nine, 20 or the full 27 points. In each case, the point clusters can be moved around using the navigator keypad. Furthermore, in the Custom menu, the single-shot AF mode can be set to either focus-priority or release-priority (i.e. the shutter will still fire even if the subject isn't in focus) while the continuous AF mode can be set to focus-priority, fps-priority or auto switching between the two. It's also possible to determine continuous AF operation for the first frame – again focus-priority, release-priority or auto switching. Focusing tracking is supplemented with a 'Hold AF' adjustment – also found in the Custom menu – which has four settings from 'Off' to 'High' to vary whether the system stays locked on to the subject regardless or will refocus on a new subject, depending on the period of interruption.

In live view or when shooting video, the 645Z relies on contrast detection measurements from the sensor which is much slower often making manual adjustment a more attractive option. Assistance is provided a focusing peaking display and/or a magnified image. The Pentax's white balance control options include the 'Multi Auto WB' measurement that was originally devised by Ricoh for its CX series higher-end compacts and the GXR system. This employs multi-point measurement to better handle scenes which include a number of different light source, essentially by determining an average colour temperature. Additionally, the 645Z also has Pentax's 'Colour Temperature Enhancement' (CTE) auto mode which increases the predominant colour in an image rather than trying to correct for it. There is a total of nine white balance presets – including four for different types of fluorescent lighting – and provisions for storing up to three custom measurements. Three manual colour temperature settings – selected from a range of 2000 to 10,000 degrees Kelvin – can also be stored. Fine-tuning in the blue-to-amber or magenta-to-green colour ranges – over a range plus/minus seven steps – is available for all the WB presets, the custom settings, the manual settings, and both the CTE and Multi Auto modes.

IN THE PICTURE

The selection of options for processing JPEGs in-camera again makes the 645Z unique in the digital medium format world where, in some cases, even the existence of JPEGs is barely acknowledged.

IF THE PURSUIT OF ABSOLUTE IMAGE QUALITY IS YOUR PRIMARY GOAL THEN HAVING A SENSOR THAT'S 1.7X TIMES LARGER THAN A FULL-35MM IMAGER, AND IN THE ORDER OF 2.5X LARGER THAN 'APS-C', MAKES THE EXTRA INVESTMENT EASIER TO JUSTIFY.

There's a total of 11 'Custom Image' picture presets which are called Bright, Natural, Portrait, Landscape, Vibrant, Radiant, Muted, Bleach Bypass, Reversal Film, Monochrome and Cross Processing. Each of the standard colour modes is adjustable for saturation, hue, sharpness, contrast and high/low key. This last parameter varies the image brightness over a range of plus/minus four steps. Adjustments to both the colour saturation and the hue are made within a RGBCMY colour hexagon display which shows the variations in colour space terms.

The Bleach Bypass preset replaces the hue adjustment with a range of eight coloured toning effects (with green as the default) while the Reversal Film preset only has an adjustment for sharpness, but the colour saturation and contrast are already boosted to replicate the look of transparency film. The Cross Processing mode has a Random setting, a choice of three preset effects and provisions for storing three favourite effects.

The Monochrome 'Custom Image' has adjustments for sharpness,

contrast and high/low key plus a set of contrast filters and a selection of toning affects. The filters are yellow, orange, red, green, magenta, blue, cyan and infrared while the toning effects range from cold-to-warm (i.e. blue-to-sepia) over plus/minus four steps. The visual effects of each preset – and any fine-tuning – can be gauged via the camera's 'Digital Preview' function which captures a preview image and displays it regardless of whether live view is activated or not. This is done by flicking the power switch to a preview position (it can also be set for an optical preview… a.k.a. depth-of-field preview) and you can then chose to save this image to a card or discard it.

CREATIVE PROCESSES

There's an impressive collection of 19 special effects which are available post-capture to edit files. These include the usual suspects such as Toy Camera, Retro, Miniature, Soft, Fish-Eye, Pastel, Sketch and Posterisation, plus others such as Shading, Invert Colour, Unicolour Bold and Bold Monochrome. There's also a 'Base Parameter Adjust' setting which enables the image's base brightness, saturation, hue, contrast and sharpness to be fine-tuned. Incidentally, these various effects can also be appended to a RAW file and subsequently applied when the image is processed post-camera.

Multi-shot HDR capture is available and records three frames with a choice of adjustable bracketing values from +/-1.0 to +/-3.0, auto adjustment or three 'strength' settings called HDR1, HDR2 and HDR3. There's also an 'Auto Align' correction to ensure the three frames are precisely matched. More importantly for some users, HDR capture is possible when shooting RAW – either PEF or DNG files – with the three component images saved in a single file.

Alternatively, the 645Z has dynamic range expansion processing with separate adjustments for the highlights and the shadows, both with an Auto correction option. The 'D-Range' corrections are performed via a combination of exposure adjustments for the highlights and an adjustment of the tone curve for the shadows.

There's also a multiple exposure facility which can capture up to 2000 shots with the choice of three composite modes to determine the overall exposure – Average, Additive or Bright. An intervalometer also allows for up to 2000 images to be captured over intervals of two seconds up to 24 hours.

ON DISPLAY

We mentioned the 645Z monitor-based info displays earlier, but it's worth adding here that there's a choice of no fewer than 12 colour schemes, including – if you so desire – yellow, orange, purple or green.

The live view screen can be configured to include a real-time histogram, a highlight warning, one of five grid patterns, the bar-type electronic level displays mentioned earlier and an exposure compensation scale. The 'Custom Image' picture modes, white balance settings and drive modes can all be directly accessed when the camera is in live view and obviously the 'Digital Preview' function is available.

The image review/playback the screens include a luminance histogram superimposed over the image, a thumbnail with a full set of histograms (i.e. luminance plus the RGB channels), both highlight and shadow warnings, the grid displays and a detailed set of Exif data. The playback editing functions include cropping and resizing, basic movie editing, the ability to save a white balance setting, copying images from one memory card to the other, and a slide show function which allows for variable display times and a selection of three transitional effects. Also here is a 'Colour Moiré Correction' facility with three strength settings, and in-camera RAW file conversion to either a JPEG or a TIFF.

Thumbnails can be displayed in groups of six, 12, 20, 35 or 80 images, or in a 'Calendar Filmstrip' display. At the other end of the size scale, zoom playback allows for image magnification of up to 16x and a 'Quick Zoom' function can be set to go straight to 2x, 4x, 8x or 16x . Copyright information can be added to the Exif data, namely the photographer's name and that of the copyright holder.

The menu design from the Pentax 'APS-C' D-SLRs is carried over to the 645Z, so each chapter is divided into stand-alone pages which are individually accessed via numbered tabs (i.e. continuous scrolling isn't available). Both the layout and navigation are fairly logical with repeated right-clicks delving into the sub-menus and settings, and then the 'Menu' button for going backwards. One ongoing idiosyncrasy is the policy of also using the right-click key for checking some functions as well as the more logical 'OK' button… so, if you are in the habit of subsequently pressing 'OK' to confirm an action, you'll actually end up switching that function off. You'll soon retrain yourself.

PERFORMANCE AND SPEED

With our reference memory card – Lexar's Professional 600x 64 GB SDXC UHS-I speed device – loaded the Pentax 645Z captured a burst of 34 JPEG/large/best frames in 11.401 seconds which represents a continuous shooting speed of 2.98 fps… a near as a whisker to the quoted 3.0 fps. For the record, the average file size was 30 MB so that's a fair amount of data

to move around, but the buffer memory still emptied extremely quickly. With a UHS-I speed card, the camera will go on shooting beyond the quoted burst length, but the frame rate is reduced.

However, it's the imaging performance that seals the deal with the 645Z… this and the fact that it's as easy to use as any smaller format D-SLR with comparable AF and metering performances.

It may look imposing, but it handles beautifully and really doesn't feel all that big in the hand (although it might with a longer lens fitted). The image quality is nothing short of stunning and, in many ways, it is just like looking at a 6x4.5cm transparency after you've been accustomed to 35mm. The best quality JPEGs exhibit a level of detailing that's truly dramatic and everything stays crisply resolved even with very big enlargements (just like medium format film). Of course, it's 51 MP resolution that's also unfettered by an anti-aliasing filter so the amount of crisply-resolved details has to be seen to be believed.

The dynamic range is also exceptional and stays impressive even at the higher ISOs up to 6400. Noise really isn't an issue up to ISO 3200 and even the ISO 6400 and 12,800 settings are quite useable, although some graininess is evident in areas of uniform tone. Because the 645Z is so comfortable to use hand-held, the imaging performance between ISO 100 and 1000 means you can do this in a wide range of lighting situations (which is where the TAv exposure mode really comes into its own).

The settings beyond ISO 51,200 really are only there for bragging rights as they're very noisy indeed. Nevertheless, the 645Z still puts in a very superior high ISO performance indeed. The various 'Custom Image' presets provide plenty of scope for tweaking colour and sharpness when shooting JPEGs. The tonal gradations are super smooth and the subtlest of shades is handled as well as the fully saturated. There really is no aspect of the 645Z's imaging performance that isn't worthy of a superlative and this certainly goes some way to justifying the purchase price.

THE VERDICT

In the light of cameras with ultra-high resolution full-35mm sensors like Nikon's D810, Canon's EOS 5Ds models or Sony's A7R II, it could be considered more challenging to mount a compelling argument for digital medium format, but the Pentax 645Z is undoubtedly that argument.

Apart from being the most affordable medium format D-SLR on the market by a long shot, it's also the most user-friendly and the most capable, particularly if you want the convenience of shooting JPEGs. It handles as comfortably as any full-35mm D-SLR and is equally comparable in terms of its operational ease and efficiency. The reliable autofocusing operation, faster shooting speed, tiltable monitor and video capabilities also put the 645Z in a class of its own, but towering above all this is its awe-inspiring imaging quality. Here the Pentax outperforms anything with a full-35mm sensor yet it costs very much less than any of its digital medium format rivals with 50 MP CMOS imagers.

On balance then, the Pentax 645Z simply can't be defined by its price alone because this pales into insignificance in the light of everything this camera offers for that money. By that test, nothing else on the market – in any sensor format – comes close.

VITAL STATISTICS

PENTAX 645Z $10,449 body only

Type: Fully automatic medium format digital SLR with Pentax 645AF2 bayonet lens mount.
Focusing: Automatic via 27-point wide-area system using phase-detection type CCD sensor arrays (including 25 cross-type arrays). Focus points may be selected manually or by the camera. Manual or auto switching between one-shot and continuous modes, the latter with a predictive function. Spot, Select, Expanded Area and Zone Select area modes. Sensitivity range is EV -3.0 to 18 (ISO 100). AF assist provided by built-in LED illuminator. AF micro-adjustment for up to 20 lenses. Contrast-detection AF in live view with manual assist via magnified image (up to 16x) and focus peaking display.
Metering: TTL via 86,000 pixels RGB sensor with multi-pattern evaluative, centre-weighted average, spot and P-TTL flash measurements. Metering range is EV -1.0 to 21 (ISO 100/55mm f2.8).
Exposure Modes: Program (with manually adjustable line; Normal, Hi-Speed Priority, DOF Priority Deep or Shallow, MTF Priority), shutter-priority auto, aperture-priority auto, shutter and aperture priority, sensitivity-priority auto, metered manual, and P-TTL flash. 'Hyper Program' switching between program and either aperture-priority or shutter-priority AE modes. 'Hyper Manual' instantly sets 'correct' exposure settings, Sensitivity priority program mode sets optimum aperture and speed for a given sensitivity setting.
Shutter: Electronic, vertical travel, metal blades, 30-1/4000 second plus 'B'. Flash sync to 1/125 second. Exposure compensation up to +/-5.0 EV in ½ or 1/3 stop increments.
Viewfinder: Keplerian telescopic trapezoid prism type. Coverage = 98% vertical/horizontal. Magnification = 0.62x (55mm lens at infinity). LCD displays and LED active focus point indicators. Interchangeable focusing screens (choice of four). Eyepiece strength adjustment built-in.
Flash: None built-in. External flash units connect via hotshoe or PC terminal.
Additional Features: Magnesium alloy bodyshell over diecast aluminium chassis; bodyshell sealed against dust and moisture, and insulated to -10 degrees Celsius; auto exposure bracketing (over two, three or five frames), depth-of-field preview, AE lock, external LCD panel (with built-in illumination), dual-mode self-timer (two or 12 second delays), three user settings memory, audible signals, wireless (IR) remote shutter release, wired remote shutter release, auto power-off (variable delay), mirror lock-up, 29 custom functions.

DIGITAL SECTION

Sensor: 52.99 million pixels CMOS with 43.8x32.8 mm area. Sensitivity equivalent to ISO 100-204,800. No optical low-pass filter.
Focal Length Increase: 1.3x with 6x4.5cm format lenses.
Formats/Resolution: Three JPEG compression settings, RAW output and TIFF. RAW+JPEG capture. RAW images can be captured as either compressed PEF or uncompressed DNG files. Four resolution settings; 8256x6192 pixels, 6912x5184, 5376x4032 and 1920x1440pixels. 24-bit RGB colour for JPEGs, 42-bit RGB colour for RAW files (captured at 8256x6192 pixels resolution).
Video Recording: Full HD = 1920x1080 pixels at 50 (interlaced), 25 or 24 (progressive scan) fps and 16:9 aspect ratio or HD = 1280x720 pixels at 50, 25 or 24 fps (progressive scan). All movie modes have Best, Better or Good quality settings. MOV format with MPEG-4 AVC/H.264 compression. Clip length of up to 25 minutes in duration or up to 4.0 GB in file size. Built-in stereo microphones with stereo microphone input and auto/manual audio levels control. Interval video recording mode at 4K (3840x2160 pixels) in Motion JPEG or AVI formats.
Recording Media: Dual slots for SD/SDHC/SDXC cards with UHS-I support. Sequential, simultaneous or separate RAW and JPEG recording file management modes. Supports Eye-Fi and FLU wireless transfer cards.
Continuous Shooting: Up to 30 frames at 3.0 fps with JPEG/large/best capture, up to 10 RAW frames, and up to 12 TIFFs. Low speed shooting at 1.0 fps for up to 300 JPEG/large/best frames.
White Balance: Auto/manual with nine presets, three custom settings, auto with multi-point measurement, fine-tuning along the amber-blue and magenta-green axes, and manual colour temperature setting (2500 to 10,000 degrees Kelvin). 'Colour Temperature Enhancement' (CTE) mode enhances the prevailing lighting tone and Multi Auto WB modes takes multiple measurements to better balance scenes containing a number of different light sources.
Interfaces: USB 3.0 'SuperSpeed', HDMI output (Micro Type D), 3.5 mm stereo audio input.
Additional Features: Live view (with contrast-detection AF), 'AA Filter Simulator' (Off, Type 1, Type 2), automatic correction for lens aberrations (distortion, lateral chromatic, peripheral illumination and diffraction), active sensor cleaning, image stabilisation via sensor shift, dual-axis electronic level display (in viewfinder and/or monitor screen), 8.1 cm TFT LCD monitor (1.037 million dots) adjustable for tilt, sRGB and Adobe RGB colour space, 11 'Custom Image' presets (Bright, Natural, Portrait, Landscape, Vibrant, Radiant, Muted, Bleach Bypass, Reversal Film, Monochrome and Cross Processing), adjustable 'Custom Image' parameters (colour tone, colour saturation gamut radar and fine, contrast, sharpness – regular and fine, high/low key and highlight/shadow contrast adjust), B&W capture with contrast filters and toning effects, 19 post-capture special effects (Base Parameter Adjust, Extract Colour, Toy Camera, Retro, High Contrast, Shading, Invert Colour, Unicolour Bold, Bold Monochrome, Tone Expansion, Sketch, Water Colour, Pastel, Posterisation, Miniature, Soft, Starburst, Fish-Eye, Slim), HDR capture mode (three exposures with Auto, HDR1, HDR2 or HDR3 adjustment; manual exposure adjustment from +/-1.0, 2.0 or 3.0; auto align), dynamic range expansion processing (highlight and/or shadow correction – On, Off, Auto), noise reduction for high ISO (Off, Auto, Custom, Low, Medium, High), noise reduction for long exposures (Off, On, Auto), multiple exposure facility (two to 2000; Additive, Average and Bright auto exposure adjustment), intervalometer (up to 2000 images, two seconds to 24 hours intervals with time delay), 'Interval Composite' mode, real-time histogram in live view, grid patterns (choice of five, black or white), histogram display in review/playback (luminance and RGB channels), highlight alert, in-camera RAW-to-JPEG/TIFF conversion, copyright information, adjustable image display time, playback zoom (up to 16x), slide show (with variable display times and transitions), image rotate, 6/12/20/35/80 thumbnail displays, calendar filmstrip display, image editing functions (Colour Moire Correction, Resize, Cropping, Movie Edit, RAW development, Image Copy, Capture a JPEG frame from movie), PictBridge and DPOF support.
Power: Rechargeable 1860 mAh lithium-ion battery pack (D-L190 type).
Dimensions (WxHxD): 156x117x123 mm (body only).
Weight: 1470 grams (body only without battery pack or memory card).
Price: $10,449 body only.
Distributor: C.R. Kennedy & Company Pty Ltd, telephone (03) 9823 1555 or visit the website at www.pentax.com.au

AUSTRALIAN TEENAGE PHOTOGRAPHER OF THE YEAR

PROUDLY SUPPORTED BY Canon

All photographs by Amelia Patman, copyright 2016.

ROUND 5 WINNER

Amelia Patman

NEW SOUTH WALES

THE WINNER of the fifth round of the Australian Teenage Photographer Of The Year competition is 18-year-old Amelia Patman from country NSW.

Amelia says she draws photographic inspirations from the things she sees around her.

"I photograph the country – as well as pet portraits – as these are places and things I love, and find my happy place in. It also allows me to highlight the history in the country and its forgotten beauty, as well as the beauty of animals."

THE HUNT IS ON FOR THE...
AUSTRALIAN TEENAGE PHOTOGRAPHER OF THE YEAR!

We're looking for the most talented teenage photographer in Australia so, if you're aged between 13 and 19, and think you've got what it takes to be published on these pages, then start putting your portfolio together.

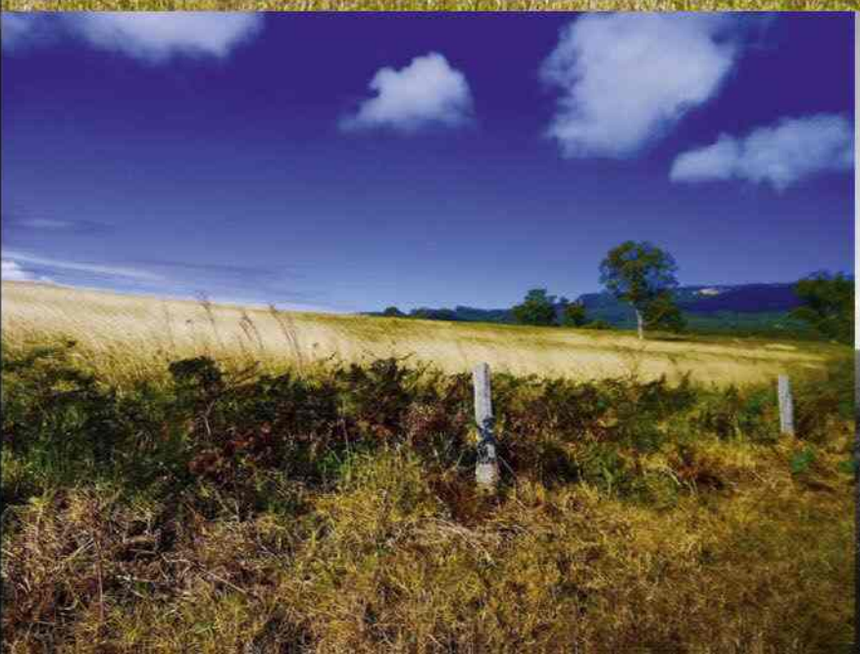
The search for the Australian Teenage Photographer Of The Year is on and we're up to our fifth finalist which means there's just one chance left for you to be in the running. Don't miss this great opportunity to get your portfolio of favourite images published on these pages… and perhaps kick off a career in photography.

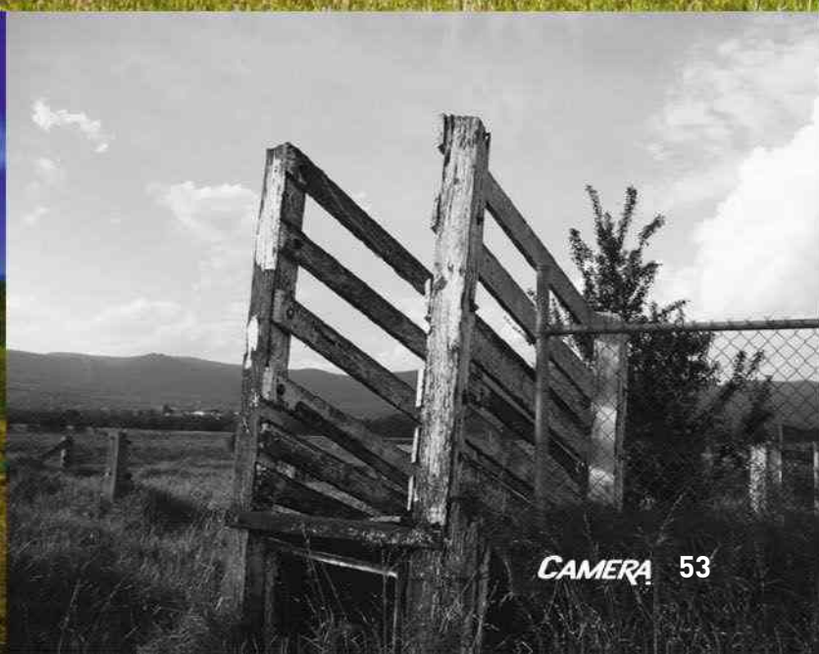
At the end of the competition, we'll judge all six finalist portfolios and crown somebody the Australian Teenage Photographer Of The Year. Our good friends at Canon Australia have given us an EOS 750D D-SLR with an EF-S 18-135mm f3.5-5.6 IS STM zoom lens, currently valued at $1449, to present as the grand prize. Furthermore, the overall winner will be presented with the inaugural Australian Teenage Photographer Of The Year trophy.

For all the details about how to enter go to **www.avhub.com.au/teenphotographer**. We look forward to seeing your work!

WIN!

A Canon EOS 750D Super Kit with EF-S 18-135mm f/3.5-5.6 IS STM Lens **valued at $1449**





EPSON
SURECOLOR SC-P800

REPORT BY TREVERN DAWES

WORK AND PLEASURE

If the A3 format SC-P600 isn't really big enough for your needs then step up to Epson's A2+ SureColor printer. Trevern Dawes tries it out using both cut sheets and papers rolls.

When a colleague told me recently about how much he loved his Epson Stylus Pro 3880 you'd have to think that he – and probably many others – was pretty satisfied with his existing A2+ format photo printer. So Epson's challenge is first to entice these users to upgrade to the new SureColor series model, and then to compete with what's on offer from chief rival Canon.

The basic shape of the SureColor SC-P800 hasn't altered from the Stylus Pro 3880, but this time the previous silver-and-black colour scheme has become an elegant all-over black... fitting nicely in with a cooler, contemporary studio or office décor. Most of the features of the A3+ format SC-P600 – such as the intuitive tilt-adjustable 6.85 cm LCD control screen and the new UltraChrome HD pigmented inkset – have been incorporated into the bigger printer.

The LCD screen is primarily used to check the status of the printer, ink levels and to generally attend to routine maintenance tasks. In many respects it becomes a central control system. Add the option of fitting a paper roll holder and the move up to the A2+ format, and the SC-P800 is essentially a step up in size from the highly-capable P600.

Weighing in at 19.5 kilograms, this printer is just manageable, but may take two sets of hands to carry and set up. If a paper roll holder is involved, the depth of the desk or bench will need to be sufficient to accommodate the extra 76.9 centimetres of depth. The LCD screen is located top right, whereas behind are the ink compartment on the left side and the replaceable maintenance tank at bottom right.

There are three paper feed systems. The top auto sheet feeder has three telescopic sections and can accommodate up to ten sheets of A2 inkjet paper or 40 sheets of plain A4 paper. The maximum paper thickness that can be handled is 1.8 millimetres. Heavyweight, fine-art and poster board up to 1.5 millimetres thick are handled one-sheet-at-a-time via the front-load system while the optional paper roll adapter attaches to the rear. The receiving tray at front opens and automatically lowers by gently pressing inwards on the three little spikes at the top of the panel. This is a classy little feature and a nice touch.

The front manual feed takes longer to load. The procedure is stepped through the LCD screen and involves lowering the platform, loading and then closing the platform ready for printing. If a step is missed a beep sounds and a message appears on the LCD screen (usually you'll forget to close the manual feed tray). When a number of manual feed prints are required, it can become tiresome going through the steps to get each print organised. As slow as this might be, it is precise and actually ensures a straight printing pathway.

GET CONNECTED

Printer connectivity is via four methods. A Hi-Speed USB 2.0 port, an Ethernet port (10/100 Base-T), Wireless-n 2.4 GHz WiFi Direct or Apple AirPrint, Google and Cloud Print support.

Today most printers have the capacity to print from WiFi and remote devices (iPad, iPhone, tablets or Smartphone, AirPrint, etc.) and now the SC-P800 also has these facilities. Whether these will be used with such a formidable printer as an alternative to print files created by image editing software and linked to the printer by cable is a matter of user choice; but at least it's all there.

The printer is supplied with a power cord, the nine start-up ink cartridges, a maintenance tank (already fitted), a set-up guide sheet and the software CD (which contains the user guide, printer driver, Easy Photo Print, Epson Net Configuration, Epson Net Set-up, Epson Net Print, software and updater, and Adobe Profile software).

The main operations manual may be downloaded from the Internet. Epson's Print Layout software is available as a free downloadable plug-in for Adobe Photoshop and Lightroom, and Nikon ViewNX-i. This facility produces images to suit a variety of display requirements.

Epson ColorBase 2 may also be downloaded and allows precise colour matching via supported spectrophotometers. It's intended as a fine-tuning arrangement for those who need to extract the utmost performance.

ATTACHMENT OF THE PAPER ROLL HOLDER TO THE REAR OF THE PRINTER IS QUICK AND EASY. THIRTY SECONDS AT MOST IS ALL IT TAKES TO ATTACH OR DETACH THIS COMPONENT.

SETTING UP

After removing all the plastic wrapping, the masses of blue tape stuck on everything that either opens or moves, and taking out the print head locking holders, it's simply a matter of letting the set up sheet guide take you through the procedures.

Switch on, press to select the English language default, wait about 30 seconds for the pop-up ink cover to release, shake each cartridge gently and install. Place the CD in the computer and follow the prompts. Allow about an hour from first opening the packaging carton to being ready to print.

The total ink in the start-up cartridges is 576 millilitres with 138 millimetres used to prime the ink lines and the print head. That represents a lot of ink at around $1 per millilitre. The ink levels will be shown about 80 percent full. This is a once-only step, but suggests when a printer is purchased, a full set of the 80 millilitres standard cartridges might just as well be acquired as well, along with a maintenance tank.

The set-up sheet makes no actual mention of a head alignment procedure so we ought to assume the factory settings are accurate for the best possible quality. In print-making, if results start to look fuzzy or vertical or horizontal lines in a print are not correctly aligned then a print head alignment is the answer.

However, if need be from day one, a set of adjustments can be applied by pressing the spanner icon on the screen, then 'Maintenance' and 'Print Head Alignment'. Add two sheets of A4 gloss or semi-gloss paper (but not plain paper) to the auto feeder and press 'Proceed'. Examine these print outs carefully and identify the cleanest image for each of the 12

The P800's tilt-adjustable LCD screen is virtually a central control system for the printer.

rows. Record the values and enter these on the LCD screen. This will confirm the factory settings are OK or will allow fine-tuning to be applied. The printer also has a photo black default when the set-up is complete.

PRINTING

The 'Main' print panel controls the media type, colour mode, print quality, paper source, paper size and advanced paper options. 'Page Layout' and 'Utility' are the supporting panels. In the 'Main' panel, Epson Standard sRGB or Adobe RGB, and PhotoEnhance are Epson's colour management options, whereas ICM locks into Photoshop (if Photoshop is set to manage colour, then 'Off – no colour adjustment' must be selected).

'High Speed' set as 'Off' can make a difference and is based on individual observations, but 'Edge Smoothing' should be left 'Off' in favour of relying mostly on 300 dpi print file resolution while 'Finest Detail' should always be left 'On'.

Right-clicking on the mouse over any feature in a print panel will allow access to a 'Help' facility for further information.

Paper take-up on the auto sheet feeder involves some clatter and the printer will occasionally pause to 'have a think' and gurgle whereas the print head action is relatively quiet.

Turning off the paper skew 'On-Off' option may be helpful too, more so for the roll and front paper paths, as this feature can be too sensitive.

The 'Main' print panel has its initial default settings. When different settings are established for a print they can be saved for quick recall in subsequent printing sessions. Ideally every favourite paper will have its own name and that will make working with different papers convenient, instead of needing to construct a new set from the default for just one print.

PROFILES

The 11 'canned' Epson profiles are grouped under 'Media Type'

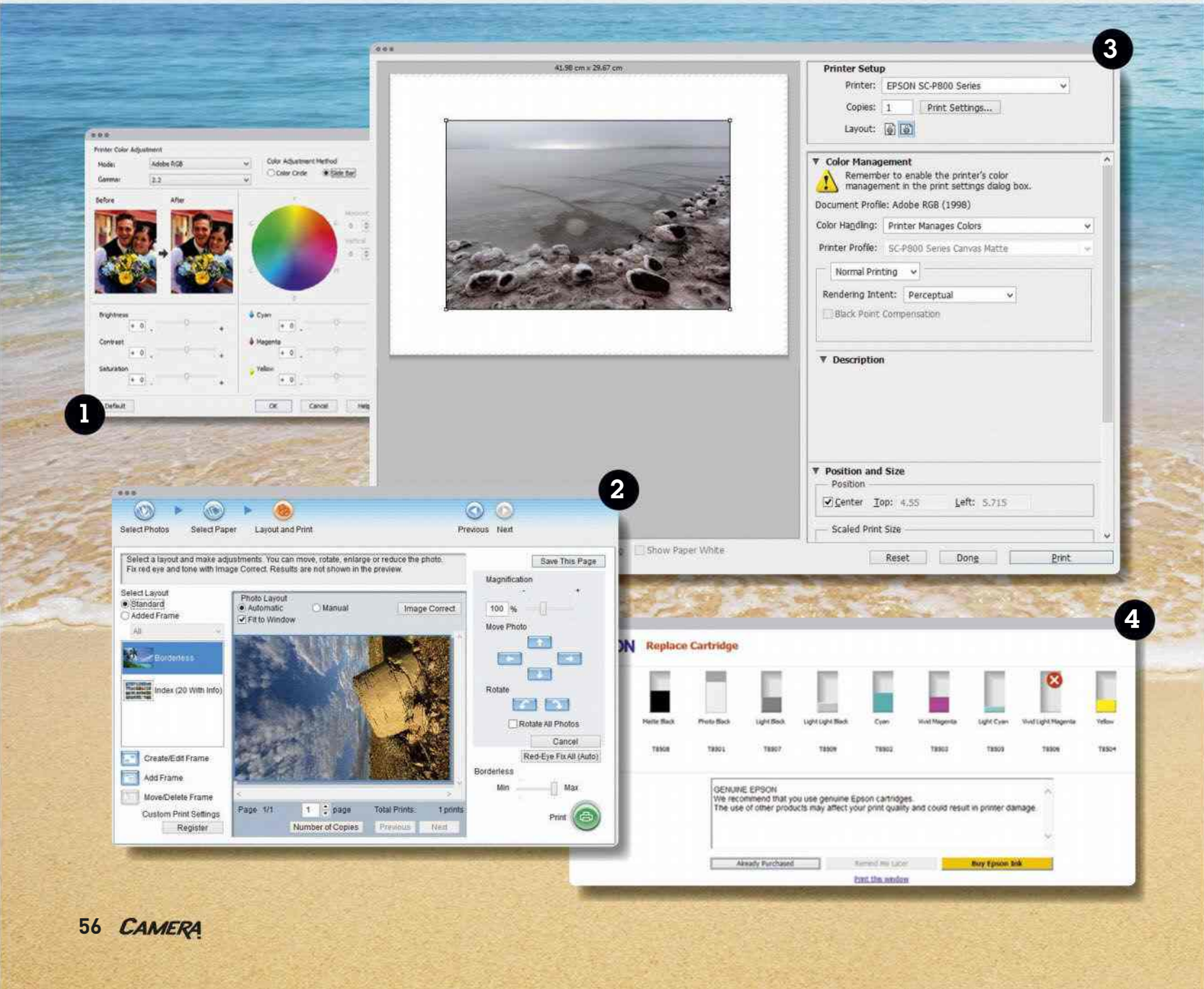
1 Adjustments to colour rendition are extensive and any new settings can be saved.

2 Epson's Easy Photo Print is an alternative way to print making.

3 The settings for Photoshop with 'Printer Manages Colour' selected for 'Colour Handling'.

4 When an ink cartridge expires, the printer stops and brings up a message.

5 The 'Print Preview' facility is an important feature on any printer.



headings of 'Photo Paper', 'Proofing Paper', 'Matte Papers, 'Fine Art Papers', 'Plain Paper' and, finally, 'Canvas'.

Paper manufacturers like Hahnemühle, Canson, etc., already provide ICC profiles for the printer. Although the profiles incorporated in the printer and by third party paper manufacturers will be perfect for most users, those who like to extract the utmost will resort to customised ICC profiles.

Most profiles for matte and fine art paper recommend 1440x720 dpi printing. Innova 280 matte was used with a profile for the SC-P800 downloaded from the Innova Website. This proved to be spot on. An A3 print with high speed off took 6:00 minutes while an A2 took 15:30 minutes.

BLACK AND WHITE

The three ink technology – photo or matte black, plus light black and light light black renders black and white prints free of any colour casting with details in shadow and highlight areas retained.

In the printer's 'Advanced Black And White' mode, the 'Neutral' setting can be altered to 'Cool', 'Warm' or 'Sepia' with further adjustments available for brightness, contrast, shadow tonality, highlight tonality, maximum optical density and highlight point shift. In other words, a complete control package that leaves little to be desired.

Gloss differential on gloss media can be reduced by adding extra light light black dots in clear areas. This is achieved in the 'Main' panel and 'Advanced' by changing the 'Off' default for 'Highlight Optical Shift' to 'On'.

A shared line between the photo black and matte black means ink losses in the changeovers and the time involved. According to one report, the matte-to-photo black switchover purges 4.6 millilitres of ink and takes 3:30 minutes. Photo-to-matte black switching consumes 1.6 millilitres of ink and takes 2:30 minutes. Nothing has changed here from the Stylus Pro 3880 and the Pro 3800 despite adverse

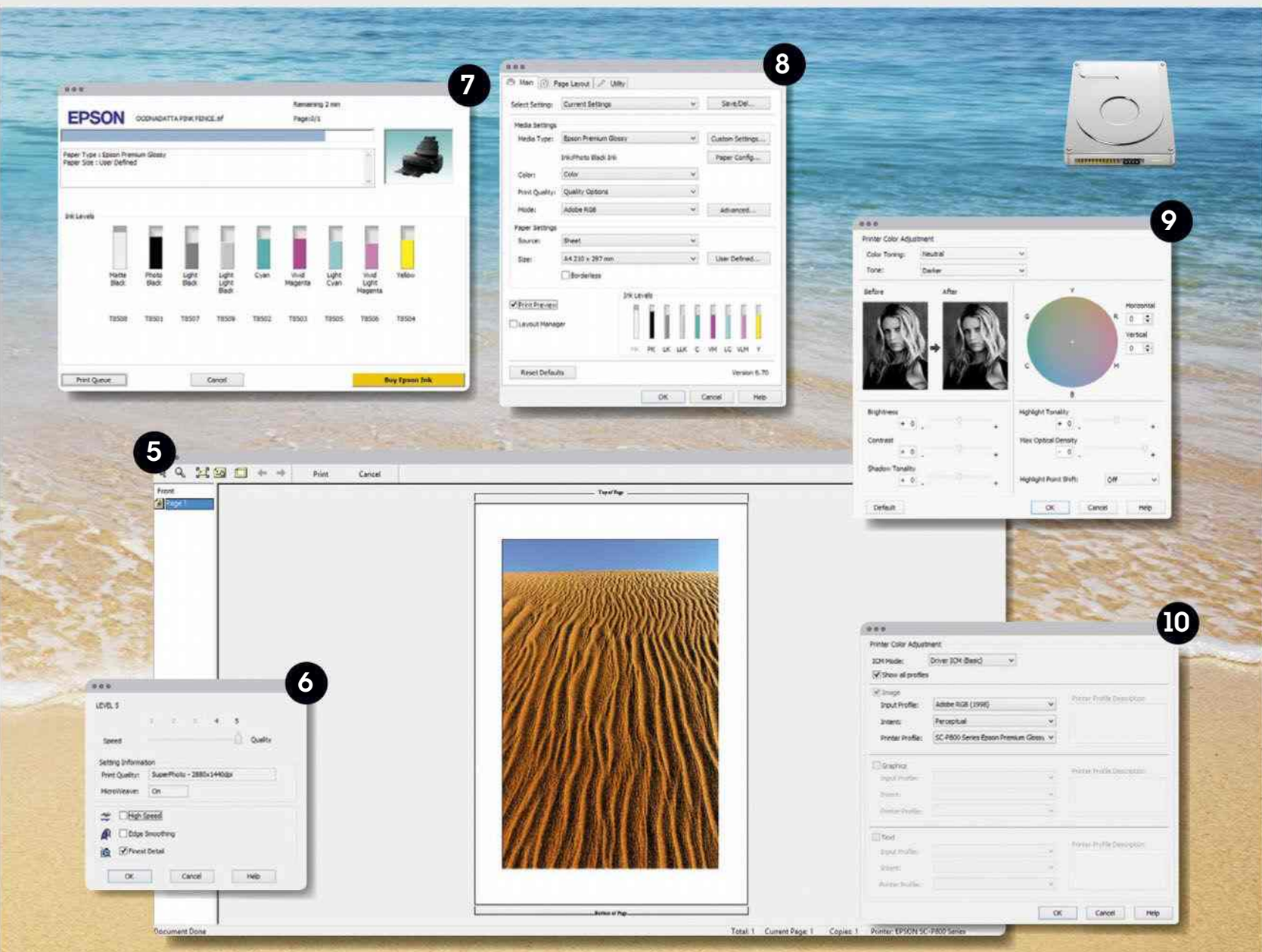
6 Print quality options default to the paper selected or can be set as required.

7 Ink levels are monitored on the LCD screen, but more details are available on the computer screen.

8 The 'Main' print panel is used to control the printer's settings.

9 The SC-P800 provides a range of adjustments for black and white printing.

10 The ICM panel locks in 'Input Profile',' Intent' and 'Printer Profile'.



THINK INK

The new UltraChrome HD inkset comprises photo black, matte black, light black, light light black, vivid magenta, vivid light magenta, cyan, light cyan and yellow. The photo black for gloss, semi-gloss and lustre media, and the matte black for matte or fine-art media share the same line into the print head and interchange according to the paper type. Coding for the ink set runs from T8502 to T8509. Start-up ink cartridges of 64 millimetres capacity each are supplied and thereafter the standard 80 millimetres cartridges are fitted.

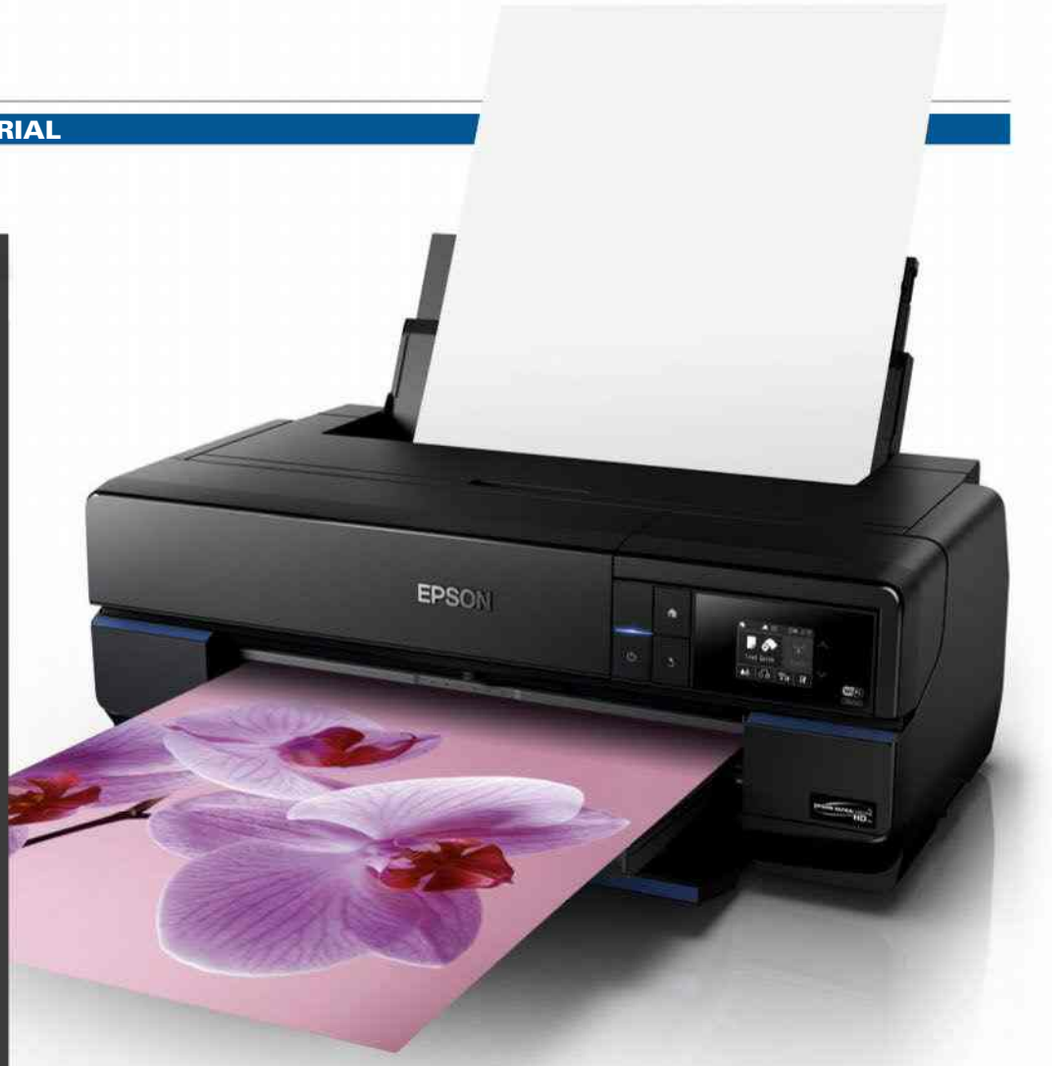
Epson promotes the UltraChrome HD inks as having enhanced colour gamut, deeper blacks (a Dmax of 2.86 claimed on Epson Lustre PGPP paper) and reduced bronzing on gloss media, along with greater print longevity over the UltraChrome K3 set. At this time Epson hints at twice the ratings of previous generations of UltraChrome inks – general album and dark storage over 200 years and black and white images exceeding 400 years. The increased longevity ratings are most significant, but as yet have not been confirmed by Wilhelm Research (see Wilhelm Research Website for details).

For those who like to delve deep into the finer points of ink technology, the data available on www.luminous-landscape.com should be studied. Here comparisons between the Stylus Pro 3880, Stylus Pro 4900 and the SC-P800 are made in terms of tonal smoothness, colour gamut, black depth, shadow detail rendition, resolution, etc.

Of course, so much does relate to the characteristics of print files in terms of tonal scale relationships, contrasts, lifting out of shadow detail, selective colour adjustment, unsharp masking, and so on.

Once into the second set of inks, the running costs are about $1.00/millilitre (with the 80 millimetres capacity cartridges currently priced at $79 each) with slight reductions for discounted prices.

The printer provides a printed report on prints created, but the amount of ink consumed for the last ten prints is a feature from the Stylus Pro 3880 that is unfortunately no longer available. For the record, an A3 size print consumed about 1.5 millilitres of ink on the Stylus Pro 3880.



comment. It's still a nuisance and a costly process, sufficient to enforce very careful planning when a variety of print media is being used. Just consider that 4.6 millilitres of ink costs about $4.60 which is the cost of two A2 size prints.

Switching from photo to matte black – and vice versa – is automatic by default and is linked to the media selection. To avoid accidental selection of the wrong paper, the automation can be changed to a manual process on the LCD panel.

INK OUT

When a cartridge has about 15 percent of ink capacity remaining a warning message will appear – "It is almost time to replace ink cartridge(s)". The word "almost" may be regarded as a generous warning as there are still many prints to make before the printer beeps and comes up with the message "Replace the following ink(s)". Simply press 'Proceed' on the LCD panel to open the chamber and make the changeover. During our test, the first ink change occurred towards the end of an A3 print. Printing resumed and the image completed. At no stage during the printer review was a print 'lost' due to a cartridge change.

The status of the maintenance tank is shown on the touch screen on the right end of the ink levels. When it's time for replacement the printer will notify you.

Attachment of the paper roll holder to the rear of the printer is quick and easy. Simply align the roller to the two orange markers, clip in and then tighten up the two screws at the base. Thirty seconds at most is all it takes to attach or detach this holder.

In order to print with the roll, change the 'Source' paper settings to 'Roll Paper'. If this setting is overlooked, the print will soon let

THE SURECOLOR SC-P800 IS ESSENTIALLY A FINE-ART PRINTER AND EXCELLENT WITH MATTE, FINE-ART AND LUSTRE PAPERS, ESPECIALLY THE HOT AND COLD PRESS MEDIA.

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you know. The LCD screen will direct the actions required to load the paper roll. Open the receiving tray and the rear tray. After the message "Feed paper into the slot as far as it will go and hold for three seconds" is addressed, the paper will load automatically to the ready position.

The printer will allocate five centimetres of space prior to printing and 1.5 centimetres at the end. When printing stops a message appears "Printing complete - cut off the printed page" with the options of 'No Cut' or 'Cut'. If 'No Cut' is selected, the printer adds more images. If 'Cut' is selected, a cutting line is printed. As a built-in auto paper cutter is not included, it is necessary to carefully cut along the line with scissors, or cut with a blade, and then press 'Finish'. The printer will adjust the paper position for the next print. In many cases custom paper sizes will be required to ensure adequate lead-in and lead-out space to assist with any framing to follow later. To disengage the roll press 'Cut/Eject' and then 'Eject'. Back roll the paper to tighten it up.

The first long print made as a test was an image 367x725 millimetres in area organised on a custom paper size of 405x900 millimetres at Level 5 quality and with high speed switched 'Off'. This took 25:30 minutes. The largest print produced on the roll was a 336x958 millimetres image made on a 405x1100 millimetres custom-set paper size. For this Level 4 quality and high speed switch 'On' was used for a far more agreeable 18:15 minutes print time.

Making a panorama print to the full 15 metres long capacity would require some planning with print file sizes and resolution. If the maximum Level 5 quality setting was used (and high speed switched 'Off'), it could well be case of letting the printer run overnight! Obviously it's helpful to run a few small test prints first before committing to the final print in order to avoid wasting paper and ink.

For those longer panoramas it is also wise to create some receiver support as the printer uses a friction drive method, has no vacuum seal system and no separate driver for the roll. Although paper rolls on two-inch cores (rather than the standard three-inch) can be accommodated by removing the outer section of the holder, expect curling problems on the tighter rolls.

The paper holder with paper detached may be left in place for printing to proceed with the auto sheet or front feed manual feeder.

The roll holder is ideal for panorama print-making or just stringing together a run of smaller prints. However, long prints of manageable length are still possible without the roll holder. The auto sheet feeder has no lead-in paper support and this will make it very awkward to ensure a long sheet is taken in squarely while the front feed prefers only fine-art papers and can be equally awkward to load. The solution lies in working with the roll paper intake.

Follow the instructions to load from the paper roll, even though it's not in place and a single sheet is being used instead. The printer will take-up the leading edge for several centimetres to ensure an accurate alignment prior to printing. Just remember to allow plenty of space at the end of the image to avoid a 'Roll Paper Out' warning situation that will result in the printer stopping.

Borderless printing is a key feature and is set to factory-prepared sizes up to A2. When a custom paper size is required, the dimensions for the width and height are established in the 'Paper Settings' and 'User Defined' in the printer's 'Main' panel. Whatever is established is saved to a convenient name, say "343x450". This must be locked in and appear on the 'Main' page. Just setting the dimensions without saving may cause inaccurate image positioning.

The roll paper holder attaches to the rear of the printer and the procedure takes no more than 30 seconds.

ON PAPER PERFORMANCES

Epson's Premium Lustre (250 gsm) ❶ paper proved to be the pick of the media linked to the Photo Black ink. The surface has a nice 'lift' without the sheen of a glossy paper while gloss differential and bronzing are barely noticeable. Several A2 prints averaged out at 19:30 minutes at the Level 5 quality setting (and high speed switched 'Off'). No prizes here for speed, but the results were very impressive and only re-enforce the popularity of this paper generally associated with the Epson Stylus Pro 3880.

Alas, there were only a few A4 **Epson Hot and Cold press sheets** ❷ from Epson's Signature Worthy sample pack to play with. Profiles were downloaded from the Epson Website and UltraSmooth Fine Art Paper selected as the media type with Level 4 quality and high speed switched 'Off'. These papers truly bring out the very best in the printer. They are not cheap by any means, but they are simply magnificent, especially the Hot Press Bright.

Epson Fine Art Velvet paper ❸ (260 gsm) in A3+ format provided noticeably more 'depth' to what was achieved on standard matte papers. This finely-stippled paper is yet another up-market Epson media to bring out the best in the printer. It would also be well-suited to the making of larger portfolio books, albeit with right-hand page images only as the reverse side is similar in surface base 'colour' and texture.

Because pigments actually do not penetrate the surface of media as per dyes, it enforces a policy of all due care, not just in ensuring the paper inserted is free of dust particles that will invariably leave white spots, but also in careful handling at all times thereafter. Protective sprays are recommended to seal the surface.

PROJECT

After an annual outback trip, having the SC-P800 on test provided the opportunity to experiment broadly with new landscapes, using various print sizes, Epson papers and also third-party papers.

All the 'canned' ICC profiles created perfect results with the Epson papers. Innova – along with most of the other brands – already has its SC-P800 profiles available for down loading. Schoeller has yet to do so, but instead of organising a custom profile Red River's profile for its 230 gsm Polar Matte and the Epson Archival Matte profile at Level 4 quality were adopted for Felix Schoeller 230 gsm matte. This proved to be a convenient and accurate arrangement. Moving up to the Level 5 quality setting added extra print time and a touch more saturation.

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MA/CAM

The printer shown with the receiving tray and the auto sheet feeder fully extended.

ATTACHMENT OF THE PAPER ROLL HOLDER TO THE REAR OF THE PRINTER IS QUICK AND EASY. THIRTY SECONDS AT MOST IS ALL IT TAKES TO ATTACH OR DETACH.

A dye-based printer is usually preferred by photo book companies because of text clarity and the capacity to print on any media without surface problems such as bronzing, gloss differential and flecking, but here was a chance to see what the pigment printer could achieve for a book of the outback journey. Stacked dual-sided 170 gsm Felix Schoeller matte paper at 329x274 millimetres (cut from A3+ sheets to leave a useful A4 remainder) flowed smoothly from Indesign files. There were no paper jams or false pickups and no need to change the paper skew setting from its 'On' default.

The book results using the highest print resolution were most pleasing with excellent colour and crisp text, right down to captions in 8-point Garamond. Perhaps not quite as bright as dye printing, but this is offset by the longevity differences with pigments. All things considered the result was certainly sufficient to confidently promote the SC-P800 as being well suited for books using matte papers.

The relationship between printing with dyes or pigments becomes a fascinating choice – dyes with marginally brighter colours, no surface problems on any media, but expensive cartridges on A3+ printers versus pigment longevity (except for Epson Claria dyes) and much cheaper printing via the 80 mm cartridges of the SC-P800.

THE VERDICT

Owners of the Stylus Pro 3880 probably won't be abandoning their trusty and much-loved machines just for the sake of keeping up with the latest printer model. However, if and when that 3880 finally gives up, any leftover inks cannot be carried over to the SC-800. Nevertheless the replacement printer won't disappoint and with improved ink technology, remote connections and a roll holder as an option, the scope is extended.

The SureColor SC-P800 is essentially a fine-art printer and excellent with matte, fine-art and lustre papers (especially the Hot and Cold Press), but the bronzing and gloss differential so common with using pigments on gloss papers needs to be addressed via a gloss optimiser cartridge (unlikely because of printer size) or changes in ink technology. The loss of ink in the changeover of the black inks is an on-going nuisance that also really needs attention.

Although the printer can handle postcards and be linked up with remote devices (albeit with slower printing), its prime role is exhibition print-making in colour or black and white up to A2+ (or longer prints) at comparatively moderate ink cost. In this role it is unsurpassed.

Despite a few minor misgivings, the SC-P800 is a pleasure to work with. The Epson reputation for quality and performance hasn't changed and the much revered Stylus Pro 3880 has a worthy successor in an on-going printer success story.

QUALITY AND SPEED

It's up to the individual to sort out the settings for each paper type. Running a magnifier over the prints may be helpful, but in the end it's what is perceived at a normal viewing distance. The general advice is to go to the Level 5 quality setting with gloss media and settle for Level 4 for matte. However, when it's a critical print, I'd always opt for Level 5 quality with the high speed option switched off… and not worry about longer print times.

THE TIME RESULTS FOR AN A3 PRINT ON THE SC-P800

LEVEL 5	LEVEL 5	LEVEL 4	LEVEL 4
SUPERPHOTO 1440x2880 dpi	SUPERPHOTO 1440x2880 dpi	SUPERFINE 1440x720 dpi	SUPERFINE 1440x720 dpi
10:20	4:00	4:45	3:00

VITAL STATISTICS

EPSON SURECOLOR SC-P800 $2195

Printer Type: A2+ format (17 inches wide) for photo-quality prints via a nine-colour pigmented inkset (but eight cartridges in use at any one time with auto switching between matte black and photo black).
Maximum Resolution: 2880x1440 dpi.
Ink Cartridges: Individual per colour, 80 millilitres capacity. Epson UltraChrome HD pigments. Colours are photo black, matte black, cyan, light cyan, vivid magenta, vivid light magenta, yellow, light black and light black. Smallest droplet size is 3.5 picolitres via 'Variable Droplet Technology'.
Paper Sizes: Borderless printing on cut sheets from 90x130 mm up to A2. Paper rolls up to 431.8 mm in width can be fitted. Customisable print sizes.
Interfaces: Hi-Speed USB 2.0, 100 Base-T Ethernet, WiFi. Epson iPrint Mobile App., Apple Airprint and Google Cloud Print.
Acoustic Noise: 49.6 dB (A).
Main Features: 6.85 cm LCD display panel with touch controls, Micro Piezo on-demand print head with 180 nozzles per colour, variable droplet sizing, five print quality/speed settings, Advanced B&W mode, auto matte/photo black ink switching (according to media type), head alignment and maintenance sensors.
Dimensions (WxHxD): 684x376x250 mm (closed).
Weight: 19.5 kilograms (without ink cartridges or media).
Price: $2195 (inc. GST). Ink cartridges are $79 each. Roll paper holder sells for $249. Maintenance tank is $22.
Distributor: Epson Australia, telephone 1300 131 928 or visit www.epson.com.au

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VIEWSONIC
VP2780-4K 27-INCH MONITOR

REPORT BY PAUL BURROWS

ViewSonic's new 27-inch Ultra HD display leverages the performance benefits of an IPS panel including colour, contrast and a wide viewing angle.

SHOW TIME

With an increasing number of cameras offering 4K video capabilities, it's probably time to think about moving your display up to this resolution too. ViewSonic's new 27-inch LED-backlit panel offers an affordable solution.

There are plenty of experiences in imaging which make it hard to go back and one of them is undoubtedly seeing a 4K resolution display for the first time. After this, 2K simply doesn't cut the mustard. Moving up to 4K is becoming more and more inevitable as the number of 4K video recording devices steadily increases as does, of course, ultra-high resolution still capture in the range of 30 to 50 megapixels.

With its new 27-inch 4K resolution (Ultra HD to be specific) LED backlit monitor,

ViewSonic throws comparative affordability into the mix and while the VP2780-4K still isn't exactly cheap, it delivers a lot of imaging performance for the money. It's a smart-looking device with a matte-black finish, and is supplied with a stylish, three-legged stand which requires only the feet to be fitted out-of-the-box. This is done via a sturdy bayonet mount which, once locked in place, is secured via a screw so there's no chance of anything coming apart. Subsequently, the stand allows for a height adjustment of up to 15 centimetres, a 60-degrees swivel either left or right, and 28 degree of tilt – five forward and 23 back. Additionally, the whole screen can be pivoted through 90 degrees for the vertical or portrait format.

The panel is an In-Plane Switching (IPS) type display with a maximum definition of 3840x2160 pixels (i.e. UHD), and which is calibrated before it leaves ViewSonic's manufacturing plant and that report is included in the supplied documentation. Delta E CIE colour calibration charts are provided for the sRGB, Native and EBU colour gamuts, along with Gamma 2.2 curve (brightness) and Grayscale Tracking (colour temperature stability) graphs. Subsequent adjustments are made to ensure the monitor can achieve the Delta E ≤2 standard of colour accuracy (i.e. a very low error count).

While, on paper, this may not actually mean all that much to the average user, the proof is in the pudding because our testing showed the factory set-up to be pretty close to the ideal with both accurate colour reproduction across the spectrum, and an impressively wide dynamic range – as evidenced by good tonality being retained in both the brightest highlights and darkest shadows. The AH-IPS panel technology also delivers an enhanced off-axis image quality so the viewing angle for this monitor is a very handy 178 degrees, both horizontally and vertically.

Using 10-bit RGB colour processing, the VP2780-4K can display up to 1.07 billion colours (from a palette of 4.39 trillion) to give 100 percent coverage of the sRGB colour space.

GOOD CONNECTIONS

The screen's surrounding bezel is quite thin, helping maintain comparatively compact overall dimensions, and on the right-end of the bottom edge is a line-up of five touch-sensitive keys. In fact, you only know that they're there because of their markings so they contribute to the monitor's very clean look externally, but in practice proved to be a bit temperamental, mostly needing several quite determined pushes before anything happened. These controls comprise the power on/off button, up/down keys for selecting various settings, and selectors for the main menu and the control screen.

At the rear ViewSonic provides a generous selection of connectivity options. The majority of the connections are arrayed along the base of the stand's mounting binnacle so the cables fall naturally away, while a pair of USB 3.0 ports are located on the side to allow the easy connection of portable devices such as jump drives. The main connection bay comprises one HDMI 2.0 port (for supporting 4K video at 60 Hz), two HDMI 1.4 ports (with charging), two 1.2a DisplayPorts (full size and mini), a further three USB 3.0 ports and a 3.5 mm headphone jack. This

JUST BEING ABLE TO BUY A 4K DISPLAY IN THIS SMALLER SCREEN SIZE IS A GOOD START, ESPECIALLY FOR ANYBODY WHO DOESN'T HAVE A HUGE AMOUNT OF DESK SPACE AT THEIR DISPOSAL.

There's a total of five USB 3.0 connections, two located on the side of the monitor for the easier connecting of portable devices.

Supplied stand allows for height adjustments as well as tilt, swivel and a 90-degree rotation.

The connection options are extensive and include HDMI 2.0, USB 3.0 and DisplayPort 1.2a.

VITAL STATISTICS

VIEWSONIC VP2780 $1200

4K 27-INCH MONITOR

Panel Type: 68.58 cm (27 inches) 'SuperClear' AH-IPS TFT LCD with LED backlighting.
Display Area: 596.74x335.66 millimetres (full scan). 16:9 aspect ratio.
Native Resolution: 3840x2160 pixels.
Pixel Density: 163 ppi.
Viewing Angles: 178 degrees horizontal and vertical
Brightness: 350 cd/m² (typical).
Contrast: 1000:1 (typical).
Display Colours: 1.07 billion from a palette of 4.39 trillion.
Colour Range: 100 percent of sRGB.
Internal Processing: 10-bits per colour
Height Adjustment Range: 15.0 centimetres.
Mount Adjustments: -5-23 degrees tilt, 60 degrees left/right swivel and 90 degrees pivot (for portrait format).
Connections: HDMI 2.0, HDMI 1.4 (2). Display Port 1.2a, Mini Display Port, USB 3.0 (5 in total), 3.5 mm headphone output.
Features: 14-bit LUT and 3D LUT, seven picture presets (sRGB, Bluish, Cool, Native, Warm, User and EBU), independent 6-axis colour adjustment (Red, Green, Blue, Cyan, Magenta and Yellow), five 'ViewMode' settings (Game, Movie, Web, Text and Mono), PIP and PBP functions (for up to four inputs), adjustable 'Blue Light Filter'.
Dimensions (WxHxD): 642.9x469.7x347.9 mm (including stand).
Weight: 8.4 kilograms (including stand).
Price: $1200 (estimated average street price). Four-year warranty.
Distributor: ViewSonic Australia, visit www.viewsonic.com.au

pretty much covers all the likely requirements of photographers and video-makers who are likely to have the need for more flexibility here than, say, a graphic designer.

MULTI TALENTED

Also useful is the provision of Multi-Picture modes for both picture-in-picture (PIP) or picture-by-picture (PBP) displays for up to four input sources, each at 1080p Full HD. There's a choice of seven colour presets including sRGB, Cool, Warm, Native and EBU (the European Broadcasting Union's colour standard for HD video production). There's also a selection of five gamma settings (1.8, 2.0, 2.2, 2.4 and 2.6) for optimising the contrast ratio and colour saturation to the application (i.e. video, stills, graphic design, etc). For manual adjustment there's a six-axis independent control which allows for the hue and saturation of each colour axis (i.e. R, G, B and C, M, Y) to be adjusted individually without affecting the other colour outputs. Some pro-level monitors allow for more, but this is arguably as much manual control as any working photographer is going to want – or need – and probably also sufficient for many videographers working in the sRGB colour space. In fact, it's in the sRGB picture mode that the ViewSonic monitor performs at its best with better than E Delta 2 errors and excellent colour accuracy and saturation across the full gamut. And it's the use of a white LED for backlighting which precludes the wider Adobe RGB colour space but contributes significantly to the affordability.

The main controls take form of a discreet touch pad on the monitor's front bezel.

THE VERDICT

Just being able to buy a 4K display in this smaller screen size is a good start, especially for anybody who doesn't have a huge amount of desk space at their disposal. Then there's the clear performance benefits derived from the individually-performed factory calibration which is spot-on – particularly for the sRGB and Native picture presets – resulting in exceptional colour accuracy and a pretty well perfect greyscale right from the start. The downside is a very limited scope for any manual calibration – rendering the User mode largely irrelevant – but this won't be an issue for anybody who just wants to get to work straightaway with a reliable display. Also praiseworthy are the excellent contrast, response speed and wide-angle viewing.

The VP2780-4K is very well built and straightforward to use save for the occasionally 'sticky' touchpad, with some truly useful features for image-makers such as the PIP/PBP modes and big selection of inputs. In addition, ViewSonic Australia has extended the warranty from three to four years. It all adds up to a very attractive combination of performance and price which makes the move up to a pro-level Ultra HD display much easier on quite a number of levels.

$2999.95

*Body Only. Lens not included.

Nikon D500 Pro DSLR

20	10	3.2"		153	
MEGA PIXEL	FRAMES PER SEC	TILT SCREEN	BUILT IN WIFI	POINT AF	4K VIDEO

Introducing Nikon's top of the line DX-Format DSLR, the D500. Boasting a host of features one would expect from the FX-format top-end models but in a much more compact size, the D500 is a perfect travel camera. At the heart of the D500 is a 20.9MP CMOS sensor which paired with an incredible ISO range, results in incredible image quality in all lighting conditions. Not to be overlooked as just a stills camera, the D500 can record 4K video at 30fps. Sharing the impressive results that you and the camera have created, or controlling the camera remotely is made possible with built in Wi-Fi & NFC.

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Ted's cameras

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ROLL YOUR OWN

MEDIUM FORMAT CAMERAS YOU CAN AFFORD

If digital medium format is beyond your budget, you can still think big because useable rollfilm cameras are now easily within reach. **Paul Burrows** looks at some of the options.

IT'S IRONIC THAT THE medium format camera sector has been the hardest hit by the transition from film to digital capture. Ironic because this is where it all started back in the early 1990s… with high-end digital capture backs – they were actually mini scanners to start with – fitted to rollfilm reflex camera bodies. However, as history has since proved, both the rise and rise of the smaller format cameras – first D-SLRs and now the mirrorless designs – plus the need to upgrade the medium format cameras to improve integration proved much too expensive for many brands.

The casualty list has included Bronica, Contax, Fujifilm (now, of course, doing extremely well with its mirrorless cameras), Rolleiflex (after many valiant struggles to survive) and the vast majority of the Mamiya range. Mamiya is now wholly owned by Phase One, the 'newcomer' that has arguably been the most successful in the digital medium format world. But even before digital capture came along, medium format had been under pressure from the continued improvement in the performance of 35mm cameras, lenses and film; so there had already been a thinning of the ranks following the disappearance of brands such as Kowa (although still going today in other areas), Plaubel, Yashica, Pentacon and Koni-Omega.

There's good news here though, because rollfilm (i.e. using 120/220 type film) cameras have mostly now become extremely affordable, aside from a handful of models that are considered highly collectable such as the older Rolleiflex TLRs. The most expensive part of buying a medium format camera system has always been the lenses, but given that these too, have needed to be upgraded to perform with large-area digital sensors, film-era optics won't necessarily break the bank either. That said, speciality lenses such as ultra-wides, macros and tilt-shift or perspective control models can still be pretty pricey, although this is now mainly because of their rarity factor.

Finding Film

The big question mark over buying 'analog' medium format cameras is, of course, the availability of film and, perhaps even more importantly, film processing services.

While the double-length 220 film is becoming very hard to find, standard 120 film remains in reasonably plentiful supply, especially in B&W. And the key advantage of shooting B&W film is, of course, that you can process it yourself (all you need is a developing tank and the right size spirals) pretty easily.

If you're prepared to go to the lengths of having your own darkroom, you can make your own prints too, but scanning the negatives and then printing digitally may be the preferred way to go. Ilford, Foma (excellent products made in the Czech Republic), Fujifilm, Kodak and Rollei B&W 120 rollfilm is still available, but you'll probably have to buy online from speciality suppliers such as lofi film photography (visit www.lofico.com.au which is also a useful resource for all things film-based).

The choice of colour 120 rollfilm stocks is diminishing significantly, but some Fujichrome E6-process (i.e. transparency) types remain available, notably Provia 100F and either Velvia 50 or 100; and a number of Kodak C41 process emulsions (i.e. colour negative) such as the Portra range. The advice here is simple – if you're serious about shooting colour 120 rollfilm, buy up big now and store it in the freezer until you need it (then allow 24 hours for a thorough defrost).

A number of speciality film processors remain, but they're now mostly restricted for the major metropolitan centres so you'll have to live with longer turnaround times, especially if you reside in a rural area, but the bottom line here is that these services are still available locally and the more people who use them, the more likely they are to stay in business.

Try Before You Buy… Or At Least Inspect

It's been a while since the vast majority of professional photographers shot with medium format film so the initial flood of used equipment has diminished and some of the cameras on sale now may well be passing through the hands of second or third owners. It also means that the tattiest of gear has probably been filtered out and you'll be looking at equipment that's been relatively well looked-after in the care of enthusiastic amateurs.

Nevertheless, it's still advisable to conduct a thorough physical inspection because although an item can look good in online illustrations, all may not be as it seems. And, it has to be said, repairs and the availability of spare parts – or, rather, the lack of – are where the dream of using medium format film cameras can really become a nightmare. A well-worn exterior isn't necessarily cause for concern because pro-level cameras are, in general, built to last, but it could also signal a well-worn interior which, put simply, spells trouble with a capital 'T'. Of course, the previous, non-professional owner may have had to deal with all the problems, but it will pay in the long-term to shop around for cameras and lenses in the best possible condition.

Given the repair situation, the all-mechanical designs are arguably a better bet than the cameras that use some electronics. Automation was slow to come to medium format cameras in the film era so mechanical models (or those using very minimal electronics) remained available throughout. Consequently, this isn't an indicator of vintage. Hasselblad's famous 500-series 6x6cm SLRs, for example, remained in production until early 2013 so an all-mechanical 503CW may still be only a few years old.

Twin Peaks

Cameras using 120/220 rollfilm date back many decades, but for the sake of this article we're only really considering the models that can be realistically used today, in terms of both their reliability and their operational ease.

The twin lens reflex – or TLR – dominated through the 1950s and early 1960s – as exemplified by the Rolleiflex in its many guises. A simple and rugged design, the TLR uses a pair of matched lenses, one for reflex viewfinding and the other for taking the picture. With the arrival of box-form SLRs, as pioneered by Hasselblad, the TLR fell out of favour among professionals, but their simplicity made them comparatively cheap to manufacture and so they remain as an affordable entry point to medium format photography through models such as the Yashicamats and the Russian-built Lubitels.

The majority of TLRs have fixed lenses, but Mamiya developed an interchangeable lens arrangement and the last-of-the-line C330 Professional S remained in production until 1994. Aside from built-in metering in some models, TLRs are fully mechanical and, given the fixed reflex mirror for viewfinding plus in-lens leaf-type shutters, they're also extremely durable so even quite old cameras should still be pretty reliable.

TLRs are undoubtedly an acquired taste, but you get a lot of camera for your money and a unique handling experience.

As noted earlier, the Rolleiflexes have the cache of their significant

1. Bronica 645RF 6x4.5cm interchangeable lens rangefinder camera
2. Bronica S2A 6x6cm SLR
3. Contax 645AF 6x4.5cm SLR
4. Fuji GW690II 6x9cm fixed lens rangefinder camera
5. FujifilmGA645Zi Pro 6x4.5cm fixed lens rangefinder camera
6. Fujica GS645S Pro 5x4.5cm fixed lens rangefinder camera

1

2

3

CONTAX

4

FUJI
Professional
6×9

5

FUJIFILM
6×45
SUPER-EBC FUJINON
ZOOM LENS
ZOOM

6

GS645S Professional

place in the history of photography so collectors outnumber users and influence prices accordingly. The later Rolleiflexes – believe it or not, production only ceased in late 2014 when the final owner of the brand name, DHW Fototechnik, went bankrupt – were essentially hand-built in small numbers and so are also comparatively expensive, being essentially limited editions. The Mamiyas are arguably the best value in TLRs, but the fixed-lens Yashicamats are both charming and cheap, assuming you can find one.

a motorised version of the 500 called the 500 EL and, once again, the later versions are the more desirable, even though the various updates or revisions were usually minor. Look for the 500 EL/M (1970-84) and beyond. In 1977 Hasselblad returned to using a focal plane shutter with its 2000 series of 6x6cm SLRs and, later, the 200 series, but these have never been as popular as the 500s. Check shutter accuracy and reliability if considering an early 2000 model such as the FC or FC/M.

> ***The big question mark over buying 'analog' medium format cameras is, of course, the availability of film and, perhaps even more importantly, film processing services.***

Swedish Beauties

One name dominates medium format film SLRs and that's Hasselblad, but the Swedish company's famous modular design – which allowed for the interchanging of lenses, viewfinders and film holders – was subsequently emulated by the Japanese, notably Bronica and Mamiya.

Hasselblad built its SLR system on the 6x6cm square image format, eventually adopting the reliability of leaf-type shutters with its famous 500C series models (the 'C' stands for 'Compur' which supplied the in-lens shutters). The original 500C was launched in 1957 and the same basic configuration – with fully mechanical operation – was retained for the next 56 years. There were many small advances along the way, making the later models more desirable for today's user, although the 500C/M which was introduced in 1970 is quite easy to work with and, in fact, stayed in production until 1994 (including a brief period when it was called the 500 Classic). The subsequent models – 501C, 501CM, 503CX, 503CXi and 503CW – all retain the traditional Hasselblad 6x6cm SLR attributes and represent a classic medium format photography experience. In 1965 Hasselblad introduced

Perhaps the quirkiest of the classic Hasselblads are the Superwide (SW) models which eliminated the mirror box and have a fixed Zeiss Biogon 38mm f4.5 ultra-wide lens with a non-coupled optical viewfinder. The SW – later called SWC – accept the standard Hasselblad 120/220 rollfilm magazines, but are significantly more compact than the SLRs and the optical performance of the 38mm Biogon (equivalent to a 21mm in 35mm terms) is legendary. The 903 SWC (1988-2001) and 905 SWC (2001-06) remain very highly sought-after – especially by landscape photographers – and have consequently retained their values.

I Want My Mamiya!

When Mamiya adopted the modular medium format SLR design, it steered clear of the 6x6cm square format and instead introduced, first in 1970, the 6x7cm format RB67 Professional and, subsequently in 1975, the 6x4.5cm M645.

The RB67 is a beast of a camera, but like the 'Blads, it's an all-mechanical design and is fully modular with, cleverly, film holders which rotate to switch between the landscape and portrait orientations. The RB mount lenses incorporate Seiko leaf shutters and the range eventually included over 20 models from a fish-eye to a telephoto. The Pro S model along with new K series lenses was launched in 1974 and, in 1990, the Pro SD which could be fitted with a 6x8cm format film magazine and L series lenses – of which there were only two, a 75mm shift lens and 500mm telephoto. The Pro SD has a larger mount for these L lenses, but the K lenses all have an adapter to enable fitting to this model (it needs to be removed for use with the earlier Pro and Pro S bodies). The Pro SD is the pick of the litter if only by virtue of these models being younger, but all RB67s were built tough and the overall reliability is generally good.

Mamiya's RZ67 was introduced in 1982 and retained the RB's revolving film backs and bellows-type focusing, but the new RZ lenses incorporated an electronically-controlled Seiko leaf shutter (which, obviously, is reliant on battery power), LED displays and provision for aperture-priority auto exposure control (when fitted with the AE prism finder). It also has a polycarbonate, rather than metal, bodyshell so, at the time, it was viewed with some scepticism by traditionalist pros and never quite gained the same popularity as the RB67 which it was meant to replace. As it happened, the RB67 stayed in production alongside the RZ67 which was subsequently updated to the RZ67 II in 1995 and RZ67 IID in 2004, the latter equipped to better integrate with digital capture backs. RB lenses can be used on the RZs – albeit with the loss of auto exposure control – but RZ lenses don't fit the RB bodies. Did the RZ67 prove to be any less reliable than its mechanical cousin? Not really as both suffered from the same mechanical wear when being worked professionally, but particularly check for any battery-related problems (and with the many electronic contacts) when contemplating an RZ67.

In contrast to the 6x7cm format Mamiya SLRs, the 6x4.5cm models are exceptionally compact and the original M645 is a pretty thing too. Mamiya continues to make a 6x4.5cm SLR – the digital-ready 645DF+ – but funnily enough these earliest models are arguably still the best for shooting film. To help keep it compact and also reduce the cost, the M645 doesn't have interchangeable film magazines, but the finders can be swapped and, of course, the lenses. There were eventually three models; the standard camera being flanked by the M645 1000S with a faster 1/1000 second shutter and additional features (including a self-timer) and, in reverse, the stripped-down M645J which was designed as a cheaper entry-level model.

A whole new camera called the M645 Super was introduced in late 1985 with a polycarbonate bodyshell and interchangeable film magazines plus a host of convenience features to bring operation more into line with that of the 35mm SLRs from the period. This included the option of adding an autowinder which was housed in a handgrip. Subsequent models were the 645 Pro (1992, the 'M' prefix was dropped), the 645 Pro TL (1997) and the 645E (2000, with a fixed prism-type viewfinder). At roughly the same time as the 645E, Mamiya launched the 645AF, again with an all-new bodyshell and, of course, autofocusing. The 645AF has subsequently spawned the 645AFD, 645AFD II, 645AFD III, 645DF and 645DF+; the latter three also being marketed as Phase One models and primarily designed for use with digital capture backs.

The Little Big Format

The 6x4.5cm format enjoyed growing popularity during the 1980s and '90s, primarily because it combined a more compact camera body (and lenses) with an image size that's still 2.7x bigger than 35mm. It also allows for 15 frames from a 120 roll so the frequency of film changes is reduced compared to either 6x6cm or 6x7cm.

As well as Mamiya, both Bronica and Pentax offered

7 Hasselblad 500C/M 6x6cm SLR

8 Hasselblad 500EL/M 6x6cm SLR with built-in autowinder

9 Hasselblad 500EL/X 6x6cm SLR with built-in autowinder

10 Hasselblad 501C/M 6x6cm SLR

11 Hasselblad 503CX 6x6cn SLR

12 Hasselblad 503CW 6x6cm SLR, limited edition with coloured leatherette inserts

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CLASSICAL HITS

THE TOP FIVE MEDIUM FORMAT FILM CAMERAS

1

Hasselblad 500C/M

The most classical of classic medium format SLRs and a chance to own one of photography's great marques.

2

Fujica/Fuji GS645S

A small camera capable of great things, and fun to use too. Still no digital equivalent either.

3

Pentax 645

So ahead of its time, it still feels contemporary over 30 years later.

4

Mamiya C330

The best TLR ever made and without the price premium that comes with the Rolleiflex badge.

5

Hasselblad SWC

Most desirable in the later 903 and 905 variants, but all models are rare and exotic photographic gems.

6x4.5cm SLRs and Fujifilm built a number of 6x4.5 cm rangefinder models with fixed lenses which offered an even more appealing balance of camera size and image size.

Bronica's ETR series of 6x4.5cm SLRs never quite achieved the popularity of Mamiya's M645 cameras, but they were preferred for wedding photography and portraiture as they used leaf-type shutters (enabling flash sync at all speeds) and interchangeable film magazines right from the start. Bronica also competed in the 6x7cm format with the GS-1 which was launched in 1983, but again never challenged the dominance of the Mamiya RB67. Nevertheless, it's a fine camera – if you can track one down – and backed by a reasonable system of leaf-shutter prime lenses.

As it is doing now with its digital medium format cameras, Pentax challenged convention with its rollfilm designs, starting with 6x7cm format 6x7 which was launched in 1969 and, instead of using a box-form configuration, looked like a 35mm SLR on steroids. This meant more balanced handling and, consequently, the 6x7 was able to be used in situations where a big box-form camera was less convenient – such as for aerial photography – particularly when the optional handgrip was fitted. The Pentax 6x7 has interchangeable viewfinders (including a metering prism), a focal plane shutter with a top speed of 1/1000 second and a lever-type film advance which provided the efficiency of single-stroke operation. Although, the 6x7 is a fully manual camera, it requires a battery for operation. Subsequent models were the 67 (1989) which introduced a range of ergonomic improvements, and the 67 II (1998) with a built-in handgrip and LCD info panel. Particularly noteworthy is the extensive system of lenses which accompanied the Pentax 6x7cm cameras which included leaf-shutter types and was continually upgraded throughout the life of the system.

Pentax's original 645 model – launched in 1984 – was even more revolutionary, bringing all the features of a contemporary 35mm SLR to a 6x4.5cm format model, including TTL centre-weighted metering, a full set of 'PASM' exposure control modes, a built-in autowinder and an LCD info display. Again, it was backed by an extensive system of lenses which are still mostly available for use on the digital 645D and 645Z models. The 645 evolved into the 645N (1997) which introduced autofocusing and multi-zone metering – both firsts for medium format SLRs – and increased the autowinder's speed from 1.5 fps to 2.0 fps. The 645N II followed in 2001 which added several new features including a mirror lock-up. In many ways, the Pentax 645N II models represent less of a 'culture shock' for anybody contemplating a medium format film camera today because, operationally at least, they're pretty similar to current D-SLRs, especially in terms of their automated systems. Additionally, any lenses that you buy – either new or second-hand – could continue to serve you should you be able to upgrade to Pentax's digital models in the future. It's worth thinking about.

Rolleiflex After The TLR

After its great success with the legendary TLRs, Rollei could never relive these glory days with its 6x6cm SLRs despite introducing the highly-capable SL66 models and then the revolutionary SLX. Built-in very small numbers compared to the Hasselblad 500 series models, the SL66 was very similar in basic configuration, but had bellows-based focusing with tilt movements for greater control over depth-of-field.

Today SL66s are hard to find and pricey compared to, say, a Hasselblad 500C/M, but if you want something truly different, it will be worth the extra effort and investment. Likewise with the SLX which was introduced in 1976 and offered the conveniences of a built-in autowinder, TTL metering, shutter-priority auto exposure control and LED indicators in the viewfinder. The SLX evolved into the 6006 (1983) which added the flexibility of interchangeable film magazines – with ingenious built-in darkslides – and features such as OTF auto flash metering. This range ultimately culminated in the 6008AF (2002) which, as well as autofocusing, has multi-zone metering, 'PASM' exposure control, auto bracketing, a full LCD viewfinder display and continuous shooting at up to 2.0 fps.

Despite nominally remaining in production until the demise of DHW Fototechnik, the 6008AF has always been a rare beast (likewise

13 Hasselblad 553ELD 6x6cm SLR with built-in autowinder

14 Hasselblad 500SWC 6x6cm fixed lens wide-angle camera

15 Lubitel 166B 6x6cm twin lens reflex (TLR)

16 Mamiya C330 Professional S 6x6cm twin lens reflex (TLR)

17 Mamiya M645 6x4.5cm SLR

18 Mamiya RB67 Professional SD 6x7cm SLR

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the Schneider-made AF lenses) and is even more so now. Be prepared to pay a lot if you really want one with a workable set of lenses.

No Mirror, No Cry

The less pricy route into medium format photography has always been via a rangefinder camera and this is still true today, especially with Fujifilm's line-up of fixed-lens models. Initially though, Fujifilm offered a choice of interchangeable lens models (badged Fujica) in the 6x7cm and 6x9cm. These cameras are now rare and highly collectible so, if affordability is your priority, it's the fixed-lens model from 1978 onward that are worth considering.

> ***Undervalued in their day, none of the Fujifilm medium format RF cameras were built in huge numbers, but they can still be found and, in most cases, are reasonably priced.***

These start with the GW690 and the GW670 which were fitted with a 90mm f3.5 lens which was equivalent in focal length to a 35mm on the GW690 and a 42mm on the GW670. Fujifilm introduced the GSW690 in 1980 which had a fixed 65mm f5.6 lens, equivalent to a 25mm in the 35mm format. Series II versions of all three models arrived in 1985 and the main changes were the addition of a hotshoe and a built-in hood on the lens plus the Fujica name was dropped in favour of simply "Fuji". The Series III cameras were launched in 1992 and featured radically restyled bodyshells and a redesigned viewfinder which has a brighter, Leica-style rectangular double-image rangefinder rather than the previous spot.

Perhaps the most interesting models, though, are the 6x4.5cm cameras which, as noted earlier, are exceptionally compact, but deliver the image quality benefits of the bigger frame size. The Fujica GS645 Professional was essentially a modern interpretation of the old 6x6cm 'folder' complete with a 75mm f3.4 lens (equivalent to 45mm) mounted on bellows so it could be retracted into the camera body, making for an even more compact package. There was also a GS645S model with a rigidly-mounted 60mm lens (equivalent to 35mm) and a GS645W with a 45mm lens (equivalent to 28mm). Both these cameras have a distinctive curved 'bumper bar' arrangement which protects the front rim of the lens. All the GS645 models have built-in metering – something that was never available on the 6x7cm and 6x9cm cameras. The later-generation GA series models, introduced in 1995, were essential medium format versions of a point-and-shoot 35mm compact with autofocus, programmed exposure control, motorised film advance and a built-in, pop-up flash. However, fully manual control is also available. As with the previous series, Fujifilm subsequently introduced a wider-angle version, called the GA645W and fitted with a 45mm f4.0 lens (equivalent to 28mm). Both were subsequently upgraded in 1997 as the GA645i and GA645Wi with the main change being the addition of a second shutter release button on the front panel. In 1998, Fujifilm introduced the last-of-the-line GA645Zi model which has a 55-90mm f4.5-6.9 zoom lens (equivalent to 35-55mm) and a restyled body with a more pronounced handgrip.

Undervalued in their day, none of the Fujifilm medium format RF cameras were built in huge numbers, but they can still be found and, in most cases, are reasonably priced. Our picks would be the GS645W for the purist approach or the GA645W if you'd prefer more automation.

Just as in the 35mm, the interchangeable lens rangefinder camera enjoyed a final fling in the medium formats before digital put an end to it all. You can have in all the popular film sizes – 6x4.5cm with the Bronica 645RF, 6x6cm with the Mamiya 6 and 6x7cm with the Mamiya 7. All were comparatively short-lived so the choice of lenses for each is small, but still provide greater versatility than the fixed lens models from Fujifilm. A bit of a surprise when it arrived in 2000, the Bronica 645RF was pretty much the brand's last roll of the dice, and it's a thoroughly modern design with fully electronic controls including program and aperture-priority exposure modes, an automatic darkslide (for lens changing) and automatic parallax correction in the viewfinder. It was launched with three leaf-shutter lenses – a 45mm f4.0 (34mm equivalent), a 65mm f4.0 (40mm) and a 135mm f4.5 (100mm) which was quickly replaced by a 100mm (75mm), but both these short telephotos are extremely hard, if not impossible, to find. With Bronica now long gone, spare parts and repairs are now a major issue which is why it might be wiser to consider the Mamiyas. Introduced in 1989, the Mamiya 6 – the last in a line of models to have this model number – is a more traditional design than the Bronica and offers the flexibility of the square format. Also more useful is the lens line-up although, again, there's only three models – a 50mm f4.0 (28mm equivalent), 75mm f3.5 (45mm) and 150mm f4.5 (82mm) – all with electronic leaf shutters. A collapsible lens mount makes the 6 more compact to store, and it offers modern 'conveniences' such as aperture-priority auto exposure control, auto frame selection in the viewfinder and single-stroke film advance. The 7 (1995) is essentially the same camera in terms of design and features, but steps up to the 6x7cm format – 4.5x larger than 35mm – so it's bigger and there's a choice of six prime lenses from a 43mm f4.5 ultra-wide (21mm equivalent) to a 210mm f8.0 telephoto (105mm). An updated model – the 7 II – was introduced in 1999 and has an updated viewfinder, a few ergonomic revisions and a multiple exposure capability. In practical terms, the changes between the two models are minor so don't be put off from buying the Mark I model. A key advantage of all the medium format RF cameras – versus some SLRs – is that loading the rollfilm is a simple right-to-left (or vice versa) procedure and so virtually no more involved than using 35mm… but, of course, you don't need to rewind at the end.

The Conclusion

Using any medium format film camera is guaranteed to be an experience, but some certainly demand more involvement than others so you need to decide whether you just want a plaything or something that will be used for serious photography, leveraging the extra imaging quality of the larger frame sizes that's now at give-away prices (well, in some cases). There are lots of good reasons for going down the mechanical route, especially if buying something that's now orphaned by the demise of its original manufacturer. While it may seem re-assuring to opt for a more automated camera, you'll be surprised how quickly and easily you can become accustomed to doing everything manually… and it's generally a whole lot more fulfilling. Given the vast majority of medium format film cameras were designed and built with professional usage in mind, reliability is generally less of a problem than might be the case with amateur cameras of a similar vintage, but the simple truth is that there's less to go wrong with an all-mechanical design versus one that employs some electronics and, in particular, is fully dependent on battery power.

The choice here, then, is huge and includes Hasselblad's 500 series cameras, the mighty Mamiya RB67 and the first M645 models, all TLRs, Fujifilm's earlier rangefinder designs and the Rollei SL66s (admittedly harder to find now than the rest of this list). Nevertheless, there are battery-dependent cameras worth considering such as the Pentax 6x7and 645, and you could safely 'go all the way' with something like the Fujifilm's autofocus GA series. If you really want to travel light, a medium format RF camera of any flavour makes sense, from 6x4.5cm up to 6x9cm.

So, don't be afraid… give medium format film photography a shot and it's virtually guaranteed you'll be completely besotted after the first roll.

19 Pentax 645 6x4.5cm SLR.

20 Pentax 6x7 6x7 cm SLR.

21 Plaubel Makina W67 6x7cm fixed lens wide-angle camera.

22 Rolleiflex 3.5F 6x6cm twin lens reflex (TLR).

23 Rolleiflex 6006 6x6cm SLR.

24 Rolleiflex SL66 6x6cm SLR.

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DIGITAL PRINT MAKER

THE BIG BOOK

Avid D-I-Y book-maker Trevern Dawes has created numerous photo books from his travels, but recently he decided to go extra-large with a portfolio-style production.

Over the years I've accumulated a vast collection of landscapes taken at Lake Gairdner and so it occurred to me that this particular theme would be ideally suited to the production of a large portfolio book. Selecting the photographs was only part of the project, as the book format, paper type and choice of inkjet printer were technical issues that all needed resolving.

For the format I decided on 483x356 millimetres, featuring 300 millimetres wide horizontal images set at 70 millimetres from the right-hand side and 80 millimetres from the left (the extra ten millimetres here being an allowance for binding). Portrait-orientated images were placed in a rectangle positioned 40 millimetres from the top of the page and 42 millimetres from the bottom.

Dual-sided inkjet paper would seem the logical choice for this sort of project and will ensure consistency of paper surfaces throughout a book. However, if only right-hand pages are being used for the images then a suitable 'standard' paper can be considered. However, it is highly desirable to choose a paper where the non-printable side is a close match to the printable side in texture and 'colour'. For obvious reasons papers with manufacturer's branding on the reverse side should be avoided.

The paper weight (i.e. the gsm – grams per square metre) and thickness were critical. Anything too light or too heavy for the format size would cause problems. For example, a 170 gsm dual-sided matte paper that's frequently used for bookwork would have been too flimsy for such a large paper size, whereas 315 gsm would be far too bulky for the number of pages involved.

After experimenting with several papers, Innova Fibra Matt 280 gsm was chosen. The sheets were cut down from a 430 millimetres wide roll and then flattened down under weights over a period of several days. Working with perfectly flat sheets is necessary to ensure easy printer pick-up and to avoid head-strike ink markings on the paper ends.

This Innova paper does not contain optical brightener agents (OBAs) yet is not too yellow either, while the surface is flat. A slightly stippled paper can lead to ink flecking and usually requires a protective sealant spray.

THE PRINTER

The page format of 484x356 millimetres essentially rules out any A3+ format printers, although the Canon A3+ printers can – unofficially – handle such a format by using the fine-art front paper feed. Nevertheless, an Epson Stylus Pro 3880 (which is A2 format) was assigned the task of printing up to 50 landscapes, a title and a page of text. Print longevity was a key issue, so despite a liking for dye-based printers, the pigments of the Epson printer were actually more persuasive.

Making a final selection of photographs for a book is never easy, let alone then determining the sequence in which they might appear. As right-hand only pages, each image at least stands alone without any need to complement what otherwise might be placed on the left-hand page. The sequence was run chronologically, commencing with the earlier film-based images through to the later images taken with digital cameras.

The Lake Gairdner project didn't require any captions or supporting text because all images

▼ Because this book has been machine stitched in sections, the pages tend to lie fairly flat when it's opened.

▶ The sheer size of the big book is best shown placed next to an A4 production.

were from this one location. However, if the book involves a variety of subjects and/or locations, then descriptions will probably need to be incorporated. In order to let each image 'breathe', supporting data is best positioned well away – either at the base of each page or on the left-hand page – in which case it's preferable to use a dual-sided inkjet paper. Preparing a small set of test pages is recommended to see how the entire project might look, particularly in terms of how both the vertical and horizontal orientated pictures will appear relevant to the established margin widths.

▼ The book is housed in a custom-made solander box. This is not only an excellent storage method, but also allows the book to be viewed without removal. A 12 mm wide 'step' on the right-hand side of the box was included to allow finger space to turn the pages.

PRINTING AND BINDING

A custom ICC profile was created for my particular printer-paper combination. The highest print resolution at the slowest speed resulted in long printing times, but with quality the prime issue, this was quite acceptable.

Each sheet was carefully checked before insertion in the printer's auto sheet feeder to ensure they were free of any dust particles.

After each print was completed, it was placed on a table to dry down. As the table could accommodate up to about ten A2 size prints, this was the maximum number targeted for any printing session.

Prior to visiting the bindery, a stop at the local art shop was required to find a suitable paper for the end papers of the book. Two very large sheets with an almost exact colour and texture match at 200 gsm were acquired. The sheets needed to be large enough to span the 966 millimetres width of two pages without needing a join at the gutter.

At the bindery a dark grey cloth was selected and silver lettering for the title assigned to the cover and spine. The pages were machine-stitched in sections to allow the book to be opened out as wide as possible. Three sets of titles on small pieces of cloth were organised, along with extra cloth and board for the preparation of a solander box.

PRESENTATION

Making a custom-sized solander box for storage and presentation requires some practice and about four hours of labour (not including the glue drying time). But when you discover just how much a commercially-made standard A2 solander box costs, you soon appreciate that a home production is worthwhile.

Acid-free craft PVA glue is highly recommended and there are a number of Internet sites which outline various construction methods.

A slip case is always a useful protection for a treasured book, but a solander box has its advantages in allowing a book to be viewed without removal from the box.

A portfolio book of 483x356 millimetres is a sizeable and relatively heavy object that won't fit on a bookshelf. That, in itself, is a limitation and may result in only one or two productions being undertaken. Nevertheless, it can be an excellent means of assembling a print collection and can actually bring immense pleasure in the making and the viewing.

2016 FUJIFILM SHOWCASE Third Round Winners

WINNER

Using B&W adds an extra element of atmosphere to this beautifully composed study of a 14th century Scottish castle in the county of Argyllshire. Sometimes having the main subject absolutely in the middle of the frame is the only way to go. Greg Hanlon used a Nikon D810 fitted with a Zeiss Apo-Sonnar 135mm f2.0 prime lens.

DO YOU WANT TO WIN?

Fujifilm Australia generously supplies the prizes for each issue's successful entrants to the Showcase. Entrants have the choice of specifying either film or a memory card (please specify on the entry coupon or indicate your preference if entering via email). The grand prize is a Fujifilm FinePix S4200 digital camera (or the equivalent should it be replaced in the meantime) which has a 14 megapixels CCD sensor and a 30x optical zoom equivalent to 24-720mm.

Note that it is not a requirement that entries to the Fujifilm Showcase be taken on Fujifilm camera equipment, either film or digital. However, film-based photographs must be originally taken on Fujifilm products. In the case of winning images that are submitted as prints, proof may be required (i.e. by supplying the original negative).

FUJIFILM SHOWCASE 2016

The 2016 Fujifilm Showcase closes on 30 September 2016. Entries received after this date will be automatically entered in the 2017 competition which starts with the November/December 2016 issue. The overall winner of the 2016 competition will be announced in the same issue. You can enter the Fujifilm Showcase as many times as you like during the year, up to four photographs each time. Please make sure you provide all the necessary camera and film/capture details on the entry coupon (which can be copied if you don't want to cut up your magazine). All entries must be accompanied by a fully completed entry coupon.

Why not have a go? Not only can you win some great prizes, but it's also a chance to see one of your pictures in print. Read the accompanying rules carefully and get snapping.

HIGHLY COMMENDED

Colours, shapes and patterns all combine here to create a compelling and absorbing image which keeps you looking around the frame to see what else you might have missed. It's the work of a very regular Fujifilm Showcase entrant, Graham Scheer, who used a Pentax K-5 fitted with a Tamron 35-80mm zoom lens.

COMMENDED

The rusty patina on this old diesel fuel pump creates an atmospheric study, helped by the warm lighting of an old barn. The photo is by Paul Watson who used a Panasonic Lumix LX100 high-end compact camera.

ENTRY GUIDELINES FOR DIGITAL IMAGES

You can enter digital images into the Fujifilm Showcase and files can be supplied on CD or DVD via mail or via email to **cameracomp@avhub.com.au**
The requirements for submitting digital files are as follows.

- 300 dpi resolution, and at a file size which enables a reproduction of up to 20x15 cm. Please avoid submitting overly large file sizes, especially when emailing the images. Up to 4.0 MB in file size is more than sufficient.
- Digital retouching and manipulation is permitted, but the judges will continue to reward good camera techniques.
- Full details of the actual camera, lens and any retouching must be supplied with the image. Images can be titled if you wish, but this isn't essential. Please make sure your CDs or DVDs are marked with your name and address.
- Up to four images may be permitted per entry.
- Please include an SAE if you would like your CD or DVD returned.
- All featured images win a Fujifilm SDHC memory card.

FUJIFILM SHOWCASE

Tell us how you did it! When you enter the Fujifilm Showcase competition, remember to explain any tips and techniques you used to achieve the result. Also, let us know the type of camera and film.

1.TITLE	CAMERA	LENS
2.TITLE	CAMERA	LENS
3.TITLE	CAMERA	LENS
4.TITLE	CAMERA	LENS

NAME

ADDRESS

STATE POSTCODE TELEPHONE

☐ Please return entries. Self-addressed postage and packaging is included.

☐ I do not want my entries returned.

Post your entry to: Fujifilm Showcase, Camera Magazine, Locked Bag 5555, St Leonards, NSW 1590 (or email to cameracomp@avhub.com.au – see above for digital submission details).

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DIGITAL SLR CAMERAS BUYER'S CHECK LIST MARCH/APRIL 2016

THIS CHECKLIST is designed to allow direct comparisons between different camera models, here listed in price order within each brand. The published prices are mostly supplied by the distributors as recommended retail prices (RRPs). However, some distributors are no longer supplying RRPs to the media so it has become necessary to determine an 'estimated street price' derived from the range of prices for a model published by retailers. Where this has been necessary, the letter 'E' appears at the start of the entry.

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				Sensor Size			Sensor Type			File Formats			Memory Cards									Exposure Modes						Features											
	Model * single lens kit ** twin lens kit	Price (Body Only Unless Noted With Asterisk*)	Megapixels (Total)	35mm	APS/DX	Four Thirds	CCD	CMOS	Foveon	RAW	TIFF	JPEG	Compact Flash	Memory Stick	SD/SDHC/SDXC * = microSD	Continuous Shooting Speed (fps)	Burst Length (U=Unlimited) Max. Resolution	Autofocus Points	Metering Zones	Program	Subject Programs	Aperture Priority	Shutter Priority	Manual	Shutter Speeds	Built-In Flash	Anti-Dust	HD Video	Mirror Lock-Up	Anti-Shake In Body	Wireless Transmitter/WiFi	Live View	Weather Proofing	Monitor Size (cm)	Weight (Body Only)	Review Issue
E	Canon EOS 1200D*	$449	18.7		•			•		•		•			•	3	100	9	63	•	•	•	•	•	30-1/4000	•	•	•	•			•		7.62	450	
E	Canon EOS 100D*	$699	18.5		•			•		•		•			•	4	28	9	63	•	•	•	•		30-1/4000	•	•	•	•			•		7.62	370	Sept/Oct '13
E	Canon EOS 700D*	$749	18.5		•			•		•		•			•	5	22	9	63	•	•	•	•	•	30-1/4000	•	•	•	•			•	•	7.62	580	Jul/Aug '13
E	Canon EOS 750D*	$1,049	24.7		•			•		•		•	•		•	5	440	19	7560	•		•	•	•	30-1/4000		•	•	•		•	•		7.62	555	
E	Canon EOS 760D*	$1,299	24.7		•			•		•		•	•		•	5	940	19	7560	•		•	•	•	30-1/4000		•	•	•		•	•		7.62	565	
E	Canon EOS 70D*	$1,349	20.9		•			•		•		•	•		•	7	40	19	63	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	7.62	670	Nov/Dec '13
E	Canon EOS 6D	$1,999	20.6	•				•		•		•			•	4.5	1250	11	63	•		•	•	•	30-1/4000		•	•	•		•	•	•	7.62	690	Mar/Apr '13
E	Canon EOS 7D Mark II	$2,149	20.9		•			•		•		•	•		•	10	U	65	252	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	7.62	910	Jan/Feb '15
E	Canon EOS 5D Mark III	$3,499	23.4	•				•		•		•	•		•	6	65	61	63	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	860	May/June '12
E	Canon EOS 5Ds	$4,999	53	•				•		•		•	•		•	5	510	61	105K	•		•	•	•	30-1/8000		•	•	•			•	•	8.1	845	Sept/Oct '15
E	Canon EOS 5DsR	$5,399	53	•				•		•		•	•		•	5	510	61	105K	•		•	•	•	30-1/8000		•	•	•			•	•	8.1	845	
E	Canon EOS-1DX	$6,899	19.3	•				•		•		•	•			12	100	61	100K	•		•	•	•	30-1/8000		•	•	•		•	•	•	7.62	1340	Nov/Dec '12
	Canon EOS-1DX Mark II	TBA	21.5	•				•		•		•	•			14	U	61	360K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	1340	
E	Nikon D3200*	$549	16.9		•			•		•		•			•	4	100	11	420	•	•	•	•	•	30-1/4000	•	•	•	•	•		•		7.62	510	Jul/Aug '11
E	Nikon D5100*	$590	24.7		•			•		•		•			•	4	100	11	420	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		8.1	510	Jul/Aug '13
E	Nikon D3300*	$599	24.7		•			•		•		•			•	5	TBA	11	420	•	•	•	•	•	30-1/4000	•	•	•	•			•		7.62	410	
E	Nikon D5200*	$799	24.7		•			•		•		•			•	5	100	39	2016	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		7.62	505	Jul/Aug '13
E	Nikon D5300*	$899	24.7		•			•		•		•			•	5	100	39	2016	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		8.1	480	
E	Nikon D5500*	$999	24.7		•			•		•		•			•	5	100	39	2106	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		8.1	420	Sept/Oct '15
E	Nikon D7000*	$1,099	16.9		•			•		•		•			•	6	100	39	2016	•	•	•	•	•	30-1/8000	•	•	•	•	•		•		7.62	690	Mar/Apr '11
E	Nikon D7100*	$1,299	24.7		•			•		•		•			•	6	33	51	2016	•	•	•	•	•	30-1/8000	•	•	•	•			•		8.1	675	Sept/Oct '13
E	Nikon D7200	$1,449	24.7		•			•		•		•			•	6	100	51	2016	•	•	•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	675	Jul/Aug '15
E	Nikon D610	$1,799	24.7	•				•		•		•			•	6	51	39	2016	•	•	•	•	•	30-1/8000	•	•	•	•			•	•	8.1	760	Mar/Apr '14
E	Nikon D750	$2,349	24.93	•				•		•		•			•	6.5	TBA	51	91K	•	•	•	•	•	30-1/4000	•	•	•	•		•	•	•	8.1	750	May/Jun '15
E	Nikon Df	$2,899	16.9	•				•		•	•	•			•	5.5	100	33	2016	•		•	•	•	30-1/4000		•		•			•	•	8.1	710	Mar/Apr '14
E	Nikon D800	$2,999	36.8	•				•		•	•	•	•		•	4	56	51	91K	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	900	Sept/Oct '12
E	Nikon D810	$3,599	37.1	•				•		•	•	•	•		•	5	100	51	91K	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	880	Sept/Oct '14
E	Nikon D810A	$3,899	37.1	•				•		•	•	•	•		•	5	U	51	91K	•		•	•	•	900-1/8000	•	•	•	•		•	•	•	8.1	880	
E	Nikon D4S	$6,699	16.6	•				•		•	•	•	•			11	200	51	91K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	1180	Nov/Dec '14
E	Nikon D3X	$9,199	25.7	•				•		•	•	•	•			5	130	51	1005	•		•	•	•	30-1/8000				•		•	•	•	7.62	1220	Mar/Apr '09
	Nikon D500	TBA	21.51		•			•		•	•	•	•		•	10	79	153	180K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	760	
	Nikon D5	TBA	21.33	•				•		•	•	•	•			12	200	153	180K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	1235	
	Pentax K-S1*	$799	20.42		•			•		•		•			•	5.4	20	11	77	•	•	•	•	•	30-1/6000	•	•	•	•	•		•		7.62	499	
	Pentax K-S2	$925	20.42		•			•		•		•			•	5.5	30	11	77	•	•	•	•	•	30-1/6000	•	•	•	•	•	•	•	•	7.62	618	Nov/Dec '15
	Pentax K-50*	$999	16.5		•			•		•		•			•	6	30	11	77	•	•	•	•	•	30-1/6000	•	•	•	•	•		•	•	7.62	590	Mar/Apr '14
	Pentax K-3 II	$1,349	24.7		•			•		•		•			•	8.3	60	27	86K	•		•	•	•	30-1/8000		•	•	•	•	•	•	•	8.1	700	
	Sony ILCA-77 II	$1,499	24.7		•			•		•		•		•	•	12	60	79	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	647	
	Sony SLT-A99	$2,499	24.7	•				•		•		•		•	•	6	15	19	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•		•	•	7.62	733	Nov/Dec '12
	Sony ILCA-77 II	$1,499	24.7		•			•		•		•		•	•	12	60	79	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	647	
	Sony SLT-A99	$2,999	24.7	•				•		•		•		•	•	6	15	19	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•		•	•	7.62	733	Nov/Dec '12

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COMPACT SYSTEM CAMERAS BUYER'S CHECK LIST MARCH/APRIL 2016

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				Sensor Size			Sensor Type			File Formats			Memory Cards							Exposure Modes						Features										
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E	Canon EOS M10*	$699	18.5		•			•		•		•			•	4.6	1000	49	384	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•	7.62	301	
E	Canon EOS M3*	$899	24.7		•			•		•		•			•	4.2	1000	41	384	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•	7.62	350	
	Fujifilm X-A1*	$649	16.3		•			•		•		•			•	5.6	30	49	256	•	•	•	•	•	30-1/4000	•	•	•	n/a			•	7.62	300	
	Fujifilm X-A2*	$749	16.5		•			•		•		•			•	6	18	49	256	•		•	•	•	30-1/4000	•	•	•	n/a			•	7.62	300	
	Fujifilm X-T10*	$1,299	16.7		•			•		•		•			•	8	8	49	256	•		•	•	•	30-1/4000		•	•	n/a		•	•	7.62	331	
	Fujifilm X-M1*	$1,099	16.3		•			•		•		•			•	5.6	30	49	256	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•	7.62	280	Nov/Dec '13
	Fujifilm X-T1	$1,699	16.7		•			•		•		•			•	6	47	49	256	•		•	•	•	30-1/4000		•	•	n/a			•	•	7.62	390	May/June '14
	Fujifilm X-E2*	$1,899	16.7		•			•		•		•			•	7	28	49	256	•		•	•	•	30-1/4000	•	•	•	n/a			•		7.62	300	Jan/Feb '14
	Fujifilm X-Pro1*	$2,499	16.3		•			•		•		•			•	6	18	49	256	•		•	•	•	30-1/4000	•	•	•	n/a			•		7.62	400	May/June '12
	Fujifilm X-Pro2	$2,699	24.3		•			•		•		•			•	8	83	273	256	•		•	•	•	30-1/32000		•	•	n/a		•	•	•	7.62	445	
	Hasselblad Lunar*	$7,995	24.7		•			•		•		•		•	•	3	17	25	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a			•		7.62	570	
	Leica T	$2,300	16.5		•			•		•		•			•	5	12	11	TBC	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•		9.4	339	Jul/Aug '14
	Leica SL	$11,000	26.3	•				•		•		•			•	11	65	49	TBC	•		•	•	•	60-1/8000		•	•	n/a		•	•	•	7.5	771	Jan/Feb '16
E	Nikon S1*	$299	12	15.9mm				•		•		•			•	15	15	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•		7.62	197	
E	Nikon J2*	$399	12	15.9mm				•		•		•			•	10	22	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•		7.62	238	
E	Nikon J3*	$499	15.1	15.9mm				•		•		•			•	15	22	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•		7.62	201	
E	Nikon J4*	$599	18.4	15.9mm				•		•		•			•	20	20	171	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	192	
E	Nikon J5*	$699	23	15.9mm				•		•		•			•*	20	20	171	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	231	
E	Nikon AW1*	$799	15.1	15.9mm				•		•		•			•*	15	22	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•	•	7.62	201	
E	Nikon V3*	$999	18.4	15.9mm				•		•		•			•*	20	20	171	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	282	Sept/Oct '14
	Olympus E-PL5*	$599	17.2			•		•		•		•			•	8	16	35	324	•	•	•	•	•	60-1/4000		•	•	n/a	•		•		7.62	279	Mar/Apr '13
	Olympus E-PL7*	$799	17.2			•		•		•		•			•	8	36	81	324	•	•	•	•	•	60-1/4000		•	•	n/a	•	•	•		7.62	279	
	Olympus E-P5*	$899	17.9			•		•		•		•			•	9	17	35	324	•	•	•	•	•	60-1/4000		•	•	n/a	•		•	•	7.62	373	
	Olympus OM-D E-M10*	$849	17.2			•		•		•		•			•	8	70	81	324	•	•	•	•	•	60-1/4000	•	•	•	n/a	•	•	•		7.62	350	Jul/Aug '14
	Olympus OM-D E-M10 II*	$999	17.2			•		•		•		•			•	8.5	79	81	324	•	•	•	•	•	60-1/4000	•	•	•	n/a	•	•	•		7.62	350	Nov/Dec '15
	Olympus OM-D E-M5 II*	$1,299	17.2			•		•		•		•			•	10	19	81	324	•	•	•	•	•	60-1/16000		•	•	n/a	•	•	•	•	7.62	417	May/June '15
	Olympus OM-D E-M1*	$1,599	17.2			•		•		•		•			•	10	49	81	324	•	•	•	•	•	60-1/8000		•	•	n/a	•	•	•	•	7.62	350	Nov/Dec '13
	Olympus PEN-F*	$1,999	21.77			•		•		•		•			•	10	45	81	324	•	•	•	•	•	60-1/8000		•	•	n/a	•	•	•		7.62	370	
	Panasonic Lumix GF7*	$699	16.8			•		•		•		•			•	5.8	u	23	1728	•	•	•	•	•	60-1/16000	•	•	•	n/a		•	•		7.62	236	
	Panasonic Lumix G6*	$899	18.3			•		•		•		•			•	4.2	u	23	1728	•	•	•	•	•	60-1/4000	•	•	•	n/a		•	•	•	7.62	340	Sept/Oct '13
	Panasonic Lumix G7*	$999	18.3			•		•		•		•			•	8	u	49	1728	•	•	•	•	•	60-1/16000	•	•	•	n/a		•	•		7.62	365	Sept/Oct '15
	Panasonic Lumix GM5*	$1,099	16.8			•		•		•		•			•	5.8	u	23	1728	•	•	•	•	•	60-1/16000		•	•	n/a		•	•		7.62	211	Mar/Apr '15
	Panasonic Lumix GX7*	$1,149	16.8			•		•		•		•			•	7	u	23	1728	•	•	•	•	•	60-1/8000	•	•	•	n/a		•	•		7.62	340	Jan/Feb '14
	Panasonic Lumix GX8*	$1,499	21.7			•		•		•		•	•			10	100	49	1728	•	•	•	•	•	60-1/16,000		•	•	n/a	•	•	•	•	7.62	435	Jan/Feb '16
	Panasonic Lumix GH4	$1,799	17.2			•		•		•		•			•	12	10	49	1728	•		•	•	•	60-1/8000	•	•	•	n/a		•	•	•	7.62	480	Jul/Aug '14
	Pentax Q-S1*	$449	12.7	9.5mm				•		•		•			•	5	5	25	1024	•	•	•	•	•	30-1/8000	•	•	•	n/a	•	•	•		7.62	183	
	Pentax Q7*	$699	12.7	9.5mm				•		•		•			•	5	5	25	16	•	•	•	•	•	30-1/2000	•	•	•	n/a	•		•		7.62	180	Jan/Feb '12
	Ricoh GXR + P10*	$499	10.6	7.59mm				•		•		•			•	5	15	9	256	•	•	•	•	•	70-1/2000	•	n/a	•	n/a	•		•		7.62	367	Sept/Oct '10
	Ricoh GXR + S10*	$649	10.4	9.5mm			•			•		•			•	1.6	15	9	256	•	•	•	•	•	180-1/2000	•	n/a		n/a	•		•		7.62	325	Mar/Apr '10
	Ricoh GXR + A12*	$799	12.9		•			•		•		•			•	3	15	9	256	•	•	•	•	•	180-1/3200	•	n/a	•	n/a			•		7.62	160	Mar/Apr '10
	Ricoh GXR + A16*	$899	16.5		•			•		•		•			•	2.5	14	9	256	•	•	•	•	•	180-1/3200	•	n/a	•	n/a			•		7.62	550	May/June '12
	Samsung NX3300*	$599	21.6		•			•		•		•			•*	5	13	21	221	•	•	•	•	•	30-1/4000			•	n/a		•	•		7.62	230	
	Samsung NX500	$999	30.7		•			•		•		•			•	9	40	205	221	•	•	•	•	•	30-1/16000		•	•	n/a		•	•		7.62	550	
	Samsung NX1	$1,899	30.7		•			•		•		•			•	15	60	205	221	•	•	•	•	•	30-1/8000	•	•		n/a		•	•	•	7.62	550	
	Sony Alpha 3500*	$599	20.4		•			•		•		•		•	•	3.5	13	25	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a	•		•		7.62	352	May/June '14
	Sony Alpha 5000*	$699	20.4		•			•		•		•		•	•	3.5	15	25	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•		7.62	210	
	Sony Alpha 5100*	$899	24.7		•			•		•		•		•	•	6	56	179	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a	•	•	•		7.62	224	
	Sony Alpha 7	$1,499	24.7	•				•		•		•		•	•	5	77	25	1200	•	•	•	•	•	30-1/8000		•	•	n/a		•	•	•	7.62	416	
	Sony Alpha 7 II	$2,299	24.7	•				•		•		•		•	•	5	77	117	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	556	
	Sony Alpha 7R	$2,899	36.8	•				•		•		•		•	•	4	15	117	1200	•	•	•	•	•	30-1/8000		•	•	n/a		•	•	•	7.62	407	
	Sony Alpha 7S	$3,299	12.4	•				•		•		•		•	•	5	77	25	1200	•	•	•	•	•	30-1/8000		•	•	n/a		•	•	•	7.62	416	
	Sony Alpha 7R II	$4,499	43.6	•				•		•		•		•	•	5	30	399	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	582	
	Sony Alpha 7S II	$4,799	12.4	•				•		•		•		•	•	5	64	169	1200		•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	584	

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